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IMPERIAL BUREAU OF ANIMAL HEALTH

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VETERINARY BULLETIN

Vol. 9.] **December, 1939.** [No. 12.

DISEASES CAUSED BY BACTERIA AND FUNGI

UDALL, D. H. (1937). **Some Views Concerning the Significance of Mastitis.**—*Cornell Vet.* **27.** 395-404. 1 table. [2 refs.]

The economic and public health significance of bovine mastitis are discussed. On the one side, in order to control the disease the milk producer is obliged to incur financial loss by withdrawing from his dairy herd cows which produce milk containing streptococci of a type commonly stated to be harmless to man. It is pointed out, however, that the streptococci which cause scarlet fever and septic sore throat in man may also be responsible for an inflammation of the bovine udder clinically identical with that caused by the *Streptococcus agalactiae* group ; milk so infected may then cause epidemics. U. also remarks that the toxins in such milk from cows with mastitis have apparently been responsible for outbreaks of gastro-enteritis in New York State, three of which involved 82-127 persons in each.—R. I.

LUYKEN, P. (1938). Haben hohe Kraftfuttergaben Einfluss auf die Zusammensetzung der Bakterienflora des Euters ? **[Influence of Rich Diet on the Bacterial Flora of the Udder].**—*Inaug. Diss., Berlin.* pp. 24. [Num. refs.]

Seventeen cows whose normal udder flora had been ascertained were divided into three groups. Group I comprised six animals which were fed on a high protein diet, group II five animals receiving a less rich diet, while the six cows in group III were fed normally. The detailed rations and the protein-starch equivalents are given. The cows were examined repeatedly over a period of six months. Three of the six in group I showed mastitis streptococci, all five in group II were infected to a greater or lesser extent, while two of the six controls in group III became affected. L. concludes that no evidence of infection due to high feeding was obtained.—P. S. WATTS.

RÖNNEFAHRT, G. (1938). Beitrag zur Kenntnis des klinischen Euterbefundes bei trockenstehenden und frischmelken Kühen mit gesunden und keimhaltigen Eutern. **[Clinical Condition of the Udder in Non-Lactating and in Lactating Cows with Healthy and Infected Udders].**—*Inaug. Diss., Berlin.* pp. 41. [6 refs.]

Palpation of the udders of 8 dry cows, due to calve, and 40 newly-calved cows was correlated with (1) naked eye examination of the secretion of the dry cows or the colostrum of the milking cows, (2) microscopic examinations of the secretion or

colostrum for bacteria and cells, and (3) bacteriological examinations. The author gives full details for every cow and concludes that during this period of the puerperium the normal variations are so great that wherever any microscopic abnormality is present in the secretions a bacteriological examination should be made, and no reliance placed upon palpation, cell content, etc.—P. S. WATTS.

DANCE, D. A., & MURRAY, T. J. (1938). **A Study of Haemolytic Properties of Streptococci on Various Blood Agars.**—*J. infect. Dis.* **63.** 122-126. 1 table. [6 refs.]

Plain agar, fresh meat extract agar, veal-extract agar, and sugar-free meat-extract agar were used in combination with human, horse, bovine, sheep, or rabbit blood. With plain agar, bovine, sheep, and rabbit blood was lysed during incubation, and so could not be used. Surface plating was adopted and observations made at 24 and 48 hours. Forty-three strains of haemolytic streptococci were studied, chiefly from human, bovine and equine sources. With few exceptions either of the organisms tested reacts in approximately the same way on all the media used, *i.e.* an organism which was haemolytic on one type of blood-agar was haemolytic on the others.—JOHN FRANCIS.

TILLETT, W. S. (1939). **The Fibrinolytic Activity of Haemolytic Streptococci.**—*Bact. Revs.* **2.** 161-216. [Numerous refs.]

The phenomenon of fibrinolysis warrants consideration from the biological standpoint and also as a factor in the pathogenesis of haemolytic streptococci. The influences of variations in technique is discussed in detail. The culture used for the study of this question should be taken at the time of maximum growth ; it is possible that accessory factors affect fibrinolysin production.

The incidence of fibrinolytic activity among human pathogenic strains is usually over 90 %. [For the correlation of fibrinolytic activity with serological and other characters see *V. B.* **9.** 61]. Groups A, B and G have been found to be fibrinolytic ; in groups C and G it is usually human strains that have this property. Non-haemolytic strains do not appear to produce fibrinolysin, and their anticoagulant effect is probably due to lactic acid. Cultures of *Pasteurella pestis* produced lysis of fibrin in blood clots from several species. In general, high fibrinolytic activity is associated with virulence and it is probably the cause of certain pathological changes. There is an apparent prediliction of strains for the fibrin of species in which they may survive or become pathogenic.

Fibrinolysin is enzymic in nature, but differs from the other proteolytic enzymes in that it exerts no hydrolytic action on casein, gelatin or peptone, and it is thought that the chemical degradation it produces in the complex fibrin is slight, although the fibrin is probably altered immunologically.

The blood of 85-90 % of normal persons may be classified as susceptible to fibrinolysis on the basis of tests in which the dissolution time of the fibrin clot is less than an hour. In about 60 % of haemolytic streptococcal infections, resistance as judged by fibrinolysis tests develops during or after the disease. The titre of antistreptolysin and antihaemolysin in the blood are not always present to the same degree.—JOHN FRANCIS.

BAUMANN, R. (1939). Gibt es eine durch Staphylokokken hervorgerufene Euteraktinomykose ? [**Actinomycosis of the Udder of a Goat due to Staphylococci**].—*Wien. tierärztl. Mschr.* **26.** 129-134. 2 figs. [Numerous refs.]

A case of actinomycosis of the right half of a goat's udder is described. The udder contained a great number of hard swellings, varying from the size of a pea

to that of a walnut. Some were encapsulated and contained cavities of a diameter of 0·5-2 cm., filled with greyish pus. Cultures made from the pus and the contents of the milk sinus contained *Staphylococcus aureus*. While the contents of the small nodules were found to contain typical staphylococci, the capsules contained clubs like those of true actinomycosis. The histological changes found in the udder and the larger nodules were similar to those found in true actinomycosis and were indistinguishable from them.—A. W. MÖLLER.

ROCHAIX, A., & RIVOLLIER, P. (1939). Recherches sur une dissociation du staphylocoque. [**Dissociation of Staphylococci**].—*Ann. Inst. Pasteur.* **62.** 577-594. 1 table. [Numerous refs.]

Previous descriptions of dissociation in staphylococci are discussed, and it is considered that a new type of dissociation has been discovered.

Six *aureus* strains isolated from pathological sources produced homogenous growths in peptone water. They were subcultured in broth T (Truche, Cramer and Cotoni)—[no details given]—and after a variable time grew in the form of clumps in a clear liquid. On plating out, two types of colonies were produced :- type A—small convex golden colonies ; type B—larger smooth, flat, white colonies. These types were stabilized by subculture and, in peptone water, type A grew in the form of clumps and type B growth was homogenous. Under suitable conditions each type was maintained for two to three years. It is considered that *Staphylococcus aureus* and *S. albus* are dissociates of the same species.

The two types had similar staining and fermentative activity. Type A had greater proteolytic, haemolytic, antigenic and pathogenic powers. Marked difference in toxigenicity was not established. Morphologically, type A corresponds to the R form and type B to the S.—JOHN FRANCIS.

GREENER, Averil W. (1939). **Anthrax in Mink** (*Mustela vison*).—*J. Hyg., Camb.* **39.** 149-153. 1 table. [17 refs.]

Deaths from anthrax among mink bred for the fur are not infrequent since the animals are commonly fed on raw beef from knackeries. Details are given of six outbreaks in England in 1938 in which 320 mink out of a total of 1,290 were proved or presumed to have died of anthrax. In one small outbreak the onset of clinical anthrax in females with latent infection was occasioned by skin abrasions during mating.

Possible danger of human infection is discussed and it is concluded that the pickling of skins (with NaCl + HCl, as usually practised) is a sufficient safeguard to human beings using the skins.—F. C. MINETT.

MIRBABAÏ, K. (1938). Le rôle de la peau dans l'infection charbonneuse. Dangers des peaux des animaux charbonneux. Prévention. [**The Role of the Skin in Anthrax**].—*Thesis, Alfort.* pp. 77. 2 tables. [Numerous refs.]

A detailed survey of the literature on the subject is given. BESREDKA's work is reviewed and its application by NICOLAS in the intradermal vaccination of horses is discussed. Human infection through the handling of infected animal products, especially skins, in the course of commerce, is dealt with, as well as the ways in which animals can become infected. The means of prevention by disinfection and by sanitary measures are described. Cultural methods of discerning infection are considered to be the most certain, but in commerce they are not generally practicable, so the Ascoli precipitin test is the method advocated. The prevalence of anthrax in Iran, its importance and the difficulties of dealing with it are referred to.—G. WILLIAMSON.

I. DE MOULIN, F. (1937). Over de beteekenis der witte bloedcellen bij miltvuurinfecties. [**The Role of White Blood Corpuscles in Anthrax**].—*Ned.-ind. Bl. Diergeneesk.* **49.** 199-212. [4 refs.] [English and German summaries].

II. DE MOULIN, F. W. K. (1938). De beteekenis van het vegetatieve zenuwstelsel bij miltvuurinfecties. [**The Autonomic Nervous System in Anthrax**].—*Ibid.* **50.** 2-44. 8 figs., 10 graphs. [Numerous refs.] [English summary].

I. The author experimented with rabbits and sheep to ascertain the importance of leucocytes in anthrax infection. The animals were subcutaneously injected in the ear with anthrax bacilli and histological examination was made of the tissue at the point of injection after 4-24 hours. The experiments were done with dead and living virulent cultures, a non-pathogenic culture, attenuated vaccine strains and " carbozoo " vaccine. Leucocyte and lymphocyte emigration was more pronounced after injection with attenuated vaccine than in virulent infections. Dead virulent bacilli were phagocytosed very slightly indeed; living virulent bacilli and the attenuated bacilli were not phagocytosed at all. Only the non-pathogenic culture was taken up by the leucocytes. Encapsulated bacilli were never found phagocytosed. Leucocyte extracts prepared from artificial sterile abscesses provoked in immunized animals were shown to have bacteriolytic power. This bacteriolytic action was most pronounced on attenuated cultures; these extracts can be inactivated by heating for half an hour at 80°C. From the lymph nodes of immunized animals an extract was prepared which had the same action. The author suggests that these extracts contain a ferment which destroys the anthrax bacilli extracellularly. This seems to be the only possible way of destroying anthrax bacilli in the body.

II. A study was made of the autonomic nervous system and some of the endocrine glands of animals infected experimentally with anthrax, some having been vaccinated previously. In cases of rapid septicaemic death from anthrax the sympathetic nerve ganglia and adrenal and thyroid glands showed severe cytoplasmic lesions, characterized by vacuolization and lysis. Even in animals only vaccinated but not infected there were signs of beginning degeneration, whilst in animals which had survived a severe infection the changes were very advanced.

Anthrax causes serious disturbance of the blood corpuscle counts, and the author suggests that this blood disorder is due to a primary disturbance of haemopoiesis acting through the nervous and hormone systems.—JAC. JANSEN (UTRECHT).

HRUŠKA, K. (1938). Die Grundbedingungen zur Milzbrandbekämpfung. [**Fundamentals of Anthrax Control**].—*Prag. tierärztl. Arch.* **18.** 61-68.

It is very difficult to produce internal anthrax by introducing virulent bacteria and spores into the mouth, stomach or rectum, as no infection occurs unless there are lesions on the mucosa. For active immunization the glucoside vaccine is recommended for cattle, but not for other animals. A single inoculation affords sufficient immunity in 8-10 days. There may be reactions, but no deaths occur. An anti-aggressin and antibacterial serum were found successful for curative purposes in man and animals. For horses the simultaneous use of serum and vaccine, with subsequent application of the second Pasteur vaccine, is advised.

—V. CHLÁDEK (PRAGUE).

OBERENDER, K. (1937). Lumineszenz des Anthraxbazillus und der anthrakoiden Bakterien im Ultraviolettlicht. [**Luminosity of *B. anthracis* and *B. anthracoides* in Ultra-Violet Light**].—*Inaug. Diss., Munich.* pp. 32. 3 tables. [Numerous refs.]

An account of an attempt to distinguish *B. anthracis* from the anthracoid bacilli by the use of ultra-violet light. The possibility of its application was tested on cultures of the organisms on solid and in fluid media, and the work is described in detail. No distinguishing feature could be found either in colour or in luminescence under the great variety of conditions studied. A detailed resumé is given of the literature concerning this means of investigation.—G. WILLIAMSON.

—. (1938). Maroc : Arrêté du directeur des affaires économiques prescrivant les mesures à prendre en vue de la prophylaxie de la tuberculose des bovidés. (Du 20 janvier 1938). [**Morocco : Decree of the 20th January 1938 on the Measures to be Taken for the Prophylaxis of Bovine TB.**]—*Bull. Off. internat. Epiz.* **17.** 445-448.

All cattle on dairy farms which contain imported or cross-bred animals must be tuberculin tested (subcutaneously) by a veterinary surgeon, at least once a year, and the reports sent to the local veterinary authorities. Each animal is to be marked on the ear with a numbered disc, and both the owner and the veterinary surgeon are to keep a comprehensive register of the cattle on the farm ; transference of cattle must be reported to the veterinary surgeon within 24 hours. These regulations do not, as yet, apply to farms containing only Moroccan cattle. All imported or cross-bred cattle must be tuberculin tested before entering a herd. The fees to be claimed by the veterinary surgeon for the tuberculin test, exclusive of the cost of the tuberculin, are fixed at ten francs for the first animal, five francs for each of the next four and three francs for each animal after five.

Positive reactors and cattle that are clinically affected with tuberculosis must be immediately isolated and branded and the byres disinfected ; clinically-affected animals must be slaughtered at once, and positive reactors at a fixed date ; the veterinary authorities must be notified of the slaughter. An indemnity is payable to the owner of 50 % of the value for clinically-affected cattle and 80 % for positive reactors not clinically affected.

HERMANSSON, K. A. (1938). Slakthusbesiktningens och organtvångets betydelse med hänsyn till påvisande av könstuberkulos hos rötkreatur. [**Meat Inspection for Genital TB. in Cattle**].—*Skand. VetTidskr.* **28.** 553-576. 10 tables. [English summary].

In the control of bovine TB. in Sweden, genital infections are regarded as very serious in spreading the disease. The existing regulations prescribe, therefore, that vaginal discharges from any cow whose new-born calf has tuberculous lesions on meat inspection shall in any case be submitted to a bacteriological examination, and that if TB. is detected, the animal shall be slaughtered immediately, government compensation being given. As detection of TB. in the new-born calf is the easiest method by which the mother cow can be traced, H. gives statistics to show the incidence of congenital TB. in calves in Sweden, and discusses the possibility of detecting such lesions by routine meat inspection.

Observations on 313 cases of congenital TB. in calves indicate that the most common sites of localization are the portal lymph nodes (99 %), secondly the kidneys or the renal lymph nodes (14 %) and, less commonly, those of the muscles (12 %). The ineffectiveness in this respect of the inspection as it is carried out at the bureaux of the Swedish Meat Inspection Service compared with that at the municipal abattoirs is clearly demonstrated by statistics, covering two years, from six towns possessing both forms of inspection working concurrently. It is calculated that only 60 % of the cases are detected at those bureaux where presentation of the organs is compulsory, and scarcely 40 % at those bureaux without compulsory organ presentation.

From the point of view of the control of bovine TB., as well as of public health, the suggestion is made that it should be compulsory that when home-slaughtered carcasses of new-born calves (milk-fattened calves should be included) are presented for meat inspection they should have the liver and lungs, with the corresponding lymph nodes, still attached uninjured to the carcass.

—GUSTAV NAERLAND (OSLO).

STRUBE, G. (1938). Beitrag zur Frage der kongenitalen Tuberkulose des Kalbes. **[Congenital Tuberculosis in Calves].**—*Inaug. Diss., Berlin.* pp. 29. 2 tables. [Numerous refs.]

The work was undertaken to ascertain whether congenital TB. of the calf is always associated with infection of the maternal uterus. The method employed was to study the uterus in slaughtered cows, whether gravid or non-gravid, and the foetus, where present. In this way 201 non-gravid and 68 gravid uteri were dealt with as well as foetuses of all ages.

Of 192 non-gravid uteri, animal inoculation confirmed the macroscopic evidence of infection in six. A detailed description of the pathological and anatomical findings in each is given and the probable mode of infection is stated.

The gravid uteri are described under four groups :– (1) 34 where neither foetus nor dam were infected with TB. ; (2) 16 where the dam had only pulmonary TB. and the foetus was free from infection ; (3) 17 where several organs other than the uterus of the dam were affected but the foetus was free, and (4) 2 where both dam and foetus were affected.—G. WILLIAMSON.

KELLAND, J., FROOD, J. L., & DOYLE, T. M. (1938). **The Eradication of Tuberculosis from a Commercial Dairy Herd.**—*Vet. J.* **94.** 93-109. 3 tables. [7 refs.]

The authors record the steps taken to eradicate tuberculosis from a commercial dairy herd of approximately 250 pedigree Guernsey and Shorthorn cattle. It is pointed out that from 1917-1934 tuberculin tests were carried out on the herd every six months and reactors removed, but infection still persisted. The owner consulted the Ministry of Agriculture in 1934 and the following recommendations were made :– (a) the herd to be tested every 60 days with synthetic medium tuberculin, and after two negative tests the interval to be three months and later six months ; (b) reactors to be removed and doubtful reactors retested, and (c) byres, yards, etc. to be thoroughly disinfected. From 1934-1936 47 reactors were removed but no reactors were found at tests in 1937. Details are given of the tuberculin tests used, with comments on the results obtained at two sites of inoculation, and results are given of autopsies and biological tests on reactor animals and animals showing anomalous reactions ; most of the latter are attributed to so-called " skin TB. " or to avian TB.—J. C. WALLACE.

REMMEL, E. (1938). Tapetud veiste trahheaal- ja bronhiaal-lima uurimisi *Mycobacterium tuberculosis* 'e ja teiste happekindlate bakterite suhtes. **[The Occurrence of *M. tuberculosis* and of other Acid-Fast Bacteria in the Tracheal and Bronchial Mucus of Slaughtered Cattle].**—*Eesti loomaarstl. Ring.* **14.** 5-9. [German summary].

The tracheal and bronchial mucus of 126 cattle, slaughtered in Tartu and showing no macroscopic tuberculous lesions in their lungs and regional lymph nodes, was examined microscopically and culturally, and in 72 cases inoculated intramuscularly into g. pigs.

Acid-fast bacteria were found in two cases ; in one case there were tubercle

bacilli of the avian type, and in the other case there were acid-fast and alcohol-fast saprophytes.—ELFRIIDE RIDALA (TARTU).

HAIDER, A. (1937). Adatok a sertések béltuberculosisához. [**Intestinal Tuberculosis of Swine**].—*Thesis, Budapest.* pp. 10. [Numerous refs.] [German summary].

Macroscopic and histological examinations were made of the intestinal tracts of 200 tuberculous swine carcasses, in which the mesenteric lymph nodes were infected; intestinal TB. could be demonstrated in only one case, and then only in the form of a focus the size of a linseed in the muscular wall of the small intestine. Hyperplasia of Peyer's patches was found in 136 cases, but this proved to be non-specific, as similar changes were also found in non-tuberculous swine, and in addition histological and bacteriological examination failed to reveal tubercle bacilli.—G. SÁLYI (BUDAPEST).

MCKAY, W. M. (1939). **Tuberculosis in the Goat.**—*Vet. Rec.* **51.** 782-783. [9 refs.]

The macroscopic lesions of pulmonary TB. in a 3½-year-old goat are described. During life the animal appeared to be perfectly healthy. A list of British references to caprine tuberculosis is given.—G. WILLIAMSON.

NEMES MIHÁLY, S. (1937). Adatok a baromfigümőkór elterjedtségéhez a népies tenyésztésben. [**Incidence of Fowl Tuberculosis in Small Holdings**].—*Thesis, Budapest.* pp. 14. 1 fig., 1 table. [German summary].

The intradermal tuberculin test was carried out on 4,934 hens from 208 farms in the same district. 358 hens (7·3 %) coming from 33 farms (15·9 %) were shown to be infected. Infection of the wattle, due to *Pasteurella aviseptica* infection, developed in some of the birds after the injection of the tuberculin. [The author discusses this point; it is impossible to draw any conclusions concerning the tuberculin reaction in the birds so affected].—G. SÁLYI (BUDAPEST).

MASTROFRANCISCO, N., & RAIMO, H. R. (1938). Estudo de um fóco de tuberculose aviária em São Paulo. [**Avian Tuberculosis in São Paulo**].—*Rev. Industr. anim.* **1.** No. 4. 43-72. 18 figs., 2 plates, 1 table. [Numerous refs.] [English summary].

Autopsy was conducted on 133 birds at Agua Funda Asylum; 85 cases of TB. were found (77 ducks, 4 fowls, 3 turkeys, and 1 peacock). Avian tuberculin was prepared as for Koch's Old Tuberculin then diluted with equal parts of normal saline, the dose being 0·1 c.c., and the test being read at 24-48 hours. It gave an accuracy of 95 % in the tests.

In 63·4 % of the birds, multiple TB. lesions were observed in the intestines and associated organs—always in the liver. Pulmonary and tracheal lesions were found in only 18·7 % of the birds. No pulmonary lesions were seen in the common domestic fowl, and in one species of Moroccan duck there were bone lesions in 16·6 %.

Excellent coloured plates and photographs are given.—J. PASFIELD.

JEZIERSKI, A. (1937). Badania nad wyosobnianiem i różnicowaniem pratków gruźlicy metodami hodowlanymi. [**Cultural Diagnosis of Tuberculosis**].—*Przegl. wet.* **52.** 633-656 and 763-795. 7 tables. [Numerous refs.] [German summary].

In tests with Petragnani's, Petroff's and Besredka's media, the latter with or

without malachite green, and with Löwenstein's medium, the last-named proved the most effective. Type differentiation was possible simply by observing the growth on the five different media, and by making subcultures on Löwenstein's medium.—V. CHLÁDEK (PRAGUE).

SUZUKI, C. (1938). Die Einteilung von Tuberkelbazillen mit Hilfe der Agglutination. [**Differentiation of Tubercle Bacilli by Means of the Agglutination Reaction**].—*Z. ImmunForsch.* **93.** 498-501.

S. examined 101 strains of tubercle bacilli by agglutination methods. Of these, three were bovine and the remainder human strains. The three bovine strains fell into one serological group by themselves, whilst about 90 of the human strains also fell into a single group. The remaining human strains fell into two more groups.—E. J. PULLINGER.

ROSENTHAL, S. R. (1939). **The Multiple Puncture Method of BCG Vaccination.** —*Amer. Rev. Tuberc.* **39.** 128-134. 2 tables. [9 refs.]

With the object of overcoming drawbacks associated with the oral and subcutaneous administration of BCG, R. has tested the reaction of g. pigs and infants to multiple small doses. The vaccine was introduced by applying a suspension containing 5 mg. of BCG per c.c. to the shaved skin, and making from 30-35 skin punctures through the drop by means of a needle.

In the case of the infants, 133 were vaccinated by this method and 102 by the intracutaneous injection of approximately 0·038 mg. as a single dose; there were 237 uninoculated controls. The superiority of the multiple puncture method was shown by the absence of gross local lesions and of suppuration in the adjacent lymph nodes. Tuberculin tests applied after one year gave 100% positive results in the two vaccinated groups, and 2·2% in the controls.—R. E. GLOVER.

SAENZ, A., & CANETTI, G. (1938). Caractères différentiels des lésions pulmonaires produites chez le lapin par injection intratesticulaire de bacilles bovins ou humains morts, enrobés dans l'huile de vaseline. [**Differential Characters of the Lesions of the Lungs in Rabbits due to Intratesticular Injections of Dead Human and Bovine Tubercle Bacilli in Vaseline**].—*C. R. Soc. Biol. Paris.* **129.** 922-924. [4 refs.]

Heat-killed bovine tubercle bacilli in vaseline were injected intratesticularly into a group of sixteen rabbits, and a similar preparation of human bacilli was injected into another group of ten rabbits. The lesions produced in the lungs of the first group by the dead bovine bacilli were extensive and caseous, surrounded by a zone of haemorrhagic infiltration, and often proved fatal within 30-60 days of injection. In contrast, the lesions due to the dead human bacilli in the lungs of the second group, killed 50-110 days after injection, were smaller, more isolated, with very little necrosis and no haemorrhagic zone. The authors conclude that the difference in the severity of the lesions caused in the lungs of the rabbit by live bovine and human tubercle bacilli, a difference quantitatively comparable to that described for the two types of dead bacilli, must depend entirely on their chemical constitution.—R. O. MUIR.

ARLOING, P., THÉVENOT, L., & VIALLIER, J. (1938). Dissociation directe des colonies R et S en partant des cultures homogènes en bouillon de souches humaines et bovines. [**Direct Dissociation of R and S Colonies of Homogeneous Broth Cultures of Human and Bovine Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **129.** 584-587. [2 refs.]

Homogeneous broth cultures of two human and five bovine strains of tubercle

bacilli, which had been grown in liquid media for 25-41 years, were studied for rate of growth on various media, tendency to dissociate by serial subculture, reversibility of R and S characters, and the effect on cultural characters of intravenous passage in the rabbit (of culture from bone-marrow). All strains gave richest and most rapid growth on ordinary agar. The bovine strains dissociated less readily than the human strains into R and S types. Culture of the bone-marrow of rabbits, after intravenous passage, yielded a rich growth of R colonies, less characteristic and abundant in the bovine than in the human strains.—R. O. MUIR.

DAMBOVICEANU, A., & DORIN, E. (1937). Contribution à l'étude de la composition chimique des bacilles acido-résistants. [**Chemical Composition of Acid-Fast Bacilli**].—*Arch. roum. Path. exp. Microbiol.* **10.** 401-451. 4 figs., 19 tables. [Numerous refs.]

The authors made a detailed study of the chemical composition of members of the acid-fast group. Particular attention was paid to the mineral composition of the organisms, and the effect on the chemical composition of the bacilli of adding mineral salts to the medium. It was found that relatively large amounts of different mineral salts (such as 20 g. % of $MgSO_4$) in the medium had no inhibitory effect on the growth of the bacilli. The acid-fast bacilli have a certain stability in their mineral composition that is not easily altered. This is in contradistinction to such an organism as the cholera vibrio [work to be published by the authors].

Under the same conditions of culture there appears to be no great difference in the total amount of minerals in tubercle bacilli and Johne's bacilli, but the latter are generally richer in magnesium.

The findings and general conclusions of this work are not suitable for abstracting, and the article should be consulted in the original by those interested in the subject.—D. L. HUGHES.

JØRGENSEN, K. L. (1937). Mastitis fremkaldt af Blandingsinfektion med Bacterium pyogenes og anaërobe Mikrokokker. [**Mastitis Caused by Combined Infection with *Corynebacterium pyogenes* and Anaerobic Micrococci**].—*Maanedsskr. Dyrlaeg.* **49.** 113-129. 1 fig. [16 refs.]

During a study of 14 cases of so-called *pyogenes* mastitis in which there was offensive pus formation, J. found a mixed infection of *Corynebact. pyogenes* and micrococci both of which developed in 5% blood agar plates. The former grew as numerous small haemolytic colonies and the latter as single large irregular opaque colonies below the surface of the agar, *i.e.* they were anaerobic.

In pure culture the micrococci were found to be gas producers and to form indol and H_2S, and they had the same smell as was found in the cases of mastitis from which they came. Clinically this type of mastitis is very severe, resulting in total destruction of the udder tissue and often in the death of the cow.

The micrococci were closely related to *Micrococcus indolicus*, but differed from it slightly with regard to H_2S production.—H. C. BENDIXEN.

ANON. (1939). **An Organism Simulating Diphtheria Bacillus** [*Corynebacterium ovis*].—*Lancet.* **236.** 94-95.

A communication to the section of Pathology of the Royal Academy of Science in Ireland dealt with the isolation of *Corynebacterium ovis* from a human throat. It came from the throat of a healthy nurse suspected of being a diphtheria carrier. It was considered to be *Corynebact. ovis* on morphological, cultural and pathogenic grounds; it produced colonies on tellurite medium suggestive of the diphtheria

bacillus, but grew more profusely than the diphtheria bacillus on Loeffler's serum and agar and became almost coccal in form after sub-culture. Long bacillary forms appeared on serum cultures after 4-6 hours. The organism fermented glucose but not saccharose [*Corynebact. murium* ferments saccharose] and it liquefied gelatin slowly. It was pathogenic for the g. pig but did not produce the congestion of the adrenals which is characteristic when death is due to the diphtheria bacillus. It was also fatal for a g. pig which had been passively immunized with diphtheria antitoxin, and it was pathogenic for the rat.—R. LOVELL.

I. TOMLIN, E. (1939). **Potassium Tellurite in the Diagnosis of Diphtheria.**—*Brit. med. J.* June 24th. 1273-1275. 3 tables. [4 refs.]

II. TOMBLESON, J. B. L., & CAMPBELL, R. M. (1939). **The Immediate Tellurite Test in Diphtheria.**—*Ibid.* 1275-1277. 3 tables. [6 refs.]

I. A technique has been described in Buenos Aires for the bedside diagnosis of diphtheria by applying to the throat exudate by means of a swab a solution of 2% potassium tellurite in distilled water. Examination of the throat from five to ten minutes afterwards showed that in 37 of 40 cases of diphtheria definite darkening occurred, whereas in 35 cases which were not diphtheria, no darkening occurred. The author has used this technique in a number of cases, and his figures suggest that the test cannot be relied upon to give a correct diagnosis in cases of diphtheria because of the high number of false positives. In those cases in which a negative result is obtained however, one may be fairly safe in assuming that the case is not one of diphtheria. In his series there must have been a number of bacteria other than the diphtheria bacillus which give the darkening reaction.

II. The authors have used the technique described in I and although there was nearly a 70% agreement between the tellurite test and the bacteriological result, they also obtained many false positive reactions with the tellurite test. In view of the objections raised they also conclude that the test cannot be relied upon to confirm or exclude a clinical diagnosis of diphtheria, although a negative finding affords presumptive evidence against diphtheria.—R. LOVELL.

JESPERSEN, K. W. (1938). Infektioner med Holths Bacil paa Svineslagteriet i Odense. [**Infection of Swine with Holth's Bacillus at the Odense Abattoir**].—*Maanedsskr. Dyrlaeg.* **50.** 65-76. 3 figs., 2 tables.

J. examined a large number of carcasses which had been detained at Odense abattoir on account of suspected tuberculosis, carrying out bacteriological culture tests with Löwenstein's and Petragnani's media. In many cases the supposed tuberculous lesions were associated with a bacillus first described by HOLTH and AMUNDSEN [*V. B.* **7.** 54]. This organism was evidently responsible for about 8% of the condemnations of the pig carcasses on account of TB. It was only found in cervical lymph nodes; the lesions were small and macroscopically could be easily mistaken for those of TB.

J. is able to diagnose correctly by inspection about two-thirds of all lesions in the cervical lymph nodes of pigs either as TB. or as the so-called "Holth-infection". The other third requires to be differentiated microscopically or culturally.—H. C. BENDIXEN.

SHANKS, P. L. (1939). **Acute Arthritis [in Pigs].**—*Vet. Rec.* **51.** 783-784. [1 ref.]

A disease of pigs 10-14 weeks old, characterized by fever and acute arthritis, is described. Mortality may be 75% or higher. The chief pathological changes observed P.M. were in the joints. These were swollen, and on incision it was found that the normal synovia had been replaced by a yellowish-grey material

which was almost fibrinous in consistency. In some cases a fibrinous pleurisy, peritonitis and pericarditis were also present. In cultures from joints a slender, haemophilic, Gram-negative bacillus was isolated. A similar organism was also seen in smears from the fibrinous deposits in the joints and in the myocardium. This organism is stated to be identical with *Haemophilus influenzae suis* isolated from the lungs in piglet influenza. Treatment with soluseptasine or M & B 693 has been found to be highly successful.—N. J. SCORGIE.

MOINE, G. (1938). La pasteurellose bovine, complication de la fièvre aphtheuse. [**Bovine Pasteurellosis, a Complication in Foot and Mouth Disease**].—*Rev. Path. comp.* **38.** 1302-1305.

M. describes an outbreak of pasteurellosis in cattle affected with F. & M. disease. Diagnosis was made from symptoms and P.M. examination. Of 12 cattle affected, 5 died. Cattle which had received inoculation with convalescent (F. & M.) blood remained unaffected. Infection is attributed to polluted water supply and invasion through lesions in the digestive tube caused by F. & M. disease.—S. J. GILBERT.

KRANEVELD, F. C., & DJAENOEDIN, R. (1938). De waarde van longweefsel voor het stellen van de diagnose septichaemia haemorrhagica. [**The Value of Lung Tissue for the Diagnosis of Haemorrhagic Septicaemia**].—*Ned.-ind. Bl. Diergeneesk.* **50.** 347-355. 2 tables. [English and German summaries].

For diagnosis of H.S. in buffaloes and cattle in the Dutch East Indies, lung tissue is often sent preserved in glycerol or equal parts of glycerol and water. By rabbit inoculation tests it was proved that pasteurella organisms could be more often demonstrated in rather large pieces of lung (2 × 2 × 3 or 4 cm.) than in small pieces. A mixture of glycerol and water seemed preferable to pure glycerol. Better results are obtained when blood or oedema fluid is sent instead of lung tissue. Experiments were made to discover whether pasteurella occurs in the throat and lungs of normal buffaloes and cattle, but the result was negative in a hundred animals that were examined.—JAC. JANSEN (UTRECHT).

I. MANNINGER, R. (1939). Die Bekämpfung des Paratyphus (Salmonellose) bei den Tieren. [**Control of Salmonella Infection in Animals**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 501-506. [In German : English, French and Italian summaries. Discussion pp. 537-540 in English and German].

II. MIESSNER, H. (1939). Die Bekämpfung der Salmonellosen (Enteritisinfektionen) bei den Tieren. [**Control of Salmonella Infection in Animals**].—*Ibid.* 519-531. [Numerous refs.] [In German : English, French and Italian summaries. Discussion pp. 537-540 in English and German].

I. The main plea in this paper was that the method of control of salmonella infection in animals should consist of the elimination of the animals which are infected with the bacilli. This cannot be achieved easily, for there are not only animals which are clinically affected with the organisms but also other apparently healthy animals which excrete them. Bacteriological diagnostic methods may not always detect these, although in the case of birds serological methods are recommended for the detection of those which are carriers of salmonella. In animals such as bovines the effort must be made to eliminate at least those which are visibly affected or recovering, because these are responsible for the heavy contamination of contact animals. Up to the present, control by means of immunization has not proved to be of value.

II. The author discussed salmonella infections in a variety of animal species,

but in all of them the methods of control included the use of a vaccine made by treatment of a culture with formalin. This control should be assisted by the slaughter of carriers and by hygienic measures in the case of bovines; in ducks the infection is transmitted by the egg and is of danger to man, and the public in Germany are advised to cook ducks' eggs at least 8 minutes; in silver fox management all food of animal origin should be cooked; in cases of abortion of mares and sheep there should be destruction of the products of abortion and the isolation of infected animals.

The discussion (common to both papers) dealt with points in the nomenclature of salmonella and a plea was made for the general adoption of the uniform nomenclature proposed by the Salmonella sub-committee of the International Society for Microbiology; KAUFFMANN of the State Serum Institute at Copenhagen would in the future be able to act as an arbiter with regard to doubtful and new strains of Salmonella. Although the use of vaccines as a measure of control was admitted as of some use by certain speakers, the consensus of opinion appeared to be that, at the present time the most effective and most suitable method of control was by the elimination of blood test reactors, and that more research was necessary before great reliance could be placed on vaccination. It was pointed out that the relative importance of the different antigens of all salmonella from an immunological aspect was only imperfectly understood, but that there was some hope that the chemical extracts now being studied by many would yield results which could eventually be applied in the field.—R. LOVELL.

SAXER, E. (1938). Untersuchungen über die Abortussalmonellose der Pferde in der Ajoie. [**Paratyphoid Abortion of Mares in the Ajoie**].—*Schweiz. Arch. Tierheilk.* **80.** 137-155 and 198-211. 5 figs., 5 charts, 1 map. [Num. refs.]

In the years 1932-33 there was an epizootic of *Salmonella abortus-equi* infection among the horses in the Ajoie district of Switzerland, animals of all ages and both sexes being attacked. The symptoms were fever, weakness and anaemia, with in some cases complications such as tendo-vaginitis, with of course abortion in the mares. Altogether at least 150 mares (20% of the pregnant mares of the district) aborted. 53 out of 69 samples of material from foetuses, foetal membranes, etc. contained almost pure cultures of *S. abortus-equi*. 92 out of 158 samples of blood (57·8%) agglutinated *S. abortus-equi* in a dilution of 1:100. The cultures obtained from the mares and from uterine exudate were uniform in their serological properties; those obtained from the foetuses varied greatly in sugar utilization. Cultures obtained from anaemic animals haemolysed horse-blood agar in 24 hours. This strain of *S. abortus-equi* was pathogenic for mice.

From control experiments it was proved that animals with a blood titre of 1:100 and higher can be regarded as infected or as carriers. No treatment was attempted, and the only means of controlling the disease is by hygienic measures together with serological tests and the removal of affected animals.—A. W. MÖLLER.

I. SHANKS, P. L. (1939). **A Record of Twelve Outbreaks of Paratyphoid Disease in Pigs in Northern Ireland.**—*Vet. J.* **95.** 180-185.

II. SAUNIÉ. (1939). A propos de la salmonellose du porc. [**Swine Salmonellosis**].—*Bull. Acad. vét. Fr.* **12.** 155-158. [4 refs.]

I. During the year ending February 1938 outbreaks of paratyphoid occurred in Northern Ireland, and a description is given of twelve such outbreaks. Very little pathological detail is given, and no bacteriology, except the statements regarding the sites from which the organism has been isolated and the fact that the organism is *Salmonella cholerae-suis* var. *kunzendorf*. S. is of the opinion

that predisposing conditions are necessary, and it is noted that in some cases the owner has bought in pigs or changed the rations, or there is overcrowding or some other unsatisfactory circumstance. Only a few pigs appear to be affected and many recover. In many cases there is a sign of pneumonic conditions, which may or may not be directly concerned with the aetiology of the disease. On one establishment where there were 6,000 pigs the incidence was reduced by providing the pigs—especially the piglets—with warm, comfortable and draught-free quarters with free access to the open yards. The efficacy of a dead vaccine used was doubtful, but treatment with M & B 693 gave encouragement sufficient to try larger scale experiments. The ages of the pigs affected on this farm were variable, up to 24 weeks.

II. An account of an infection in piglets from which *Salmonella cholerae-suis* was isolated is given. The morbidity is given as 20% and the mortality 95%. Predisposing conditions are cited here also and instances given of a diet too rich in proteins, weaning and sudden changes in the weather. The use of a vaccine prepared by formalinizing a culture is considered to have given good results. The piglets were given the first injection at the age of 10 days and the second 15 days later. When the infection showed itself earlier, then the first dose was given at birth. The author also tried a serum prepared in horses against other species of salmonella, and claims by this means to have prevented the spread of the disease to other piglets of the same litter.—R. LOVELL.

BUZNA, D. (1936). Ujabb vizsgálatok a Bacillus suipestifer kimutátásaról. [*Salmonella cholerae-suis* **Infection in Pigs**].—*Állatorv. Lapok.* **59.** 381-383. 3 tables.

B. examined the faeces of 2,782 healthy swine brought to Budapest from different regions of Hungary by rail. Using an enrichment method [*V. B.* **6.** 493.] which he states is most reliable he demonstrated *S. cholerae-suis* in 296 cases (10·5%) of the animals; the incidence in the pigs of English breeds was 13·9%, while that in Mangalica pigs was only 8·5%. He considers that the high percentage of infection was due to the fact that fatigue after rail transport and also, very probably, other conditions likely to lower vitality, such as pregnancy or parturition, favoured the multiplication of the bacteria in the intestine. The percentage of infected animals appeared subject to a seasonal variation, being somewhat higher in autumn and early winter than in February, March and April.
—G. SÁLYI (BUDAPEST).

I. CASPERSEN, J. (1937). Paratyfusepidemi med eiendommelig smittekilde. [**A Paratyphoid Outbreak with a Peculiar Origin (Dog)**].—*Forh. Norsk. Med. Selsk.* ***1937.*** pp. 138-143. Suppl. to *Norsk Mag. Laegevidensk.* **10.**

II. ANON. (1938). **Dogs as Paratyphoid Carriers.**—*Lancet.* **234.** 214.

III. MAGNUSSON, K. E. (1938). Ein Hund als Ansteckungsquelle von Paratyphusinfektionen. [**A Dog as Source of Paratyphoid Infection**].—*Z. Hyg. InfektKr.* **121.** 136-138. [1 ref.]

IV. GARD, S. (1938). Ein neuer Salmonella-Typ (S. abortus canis). [**A New Type of Salmonella (*S. abortus canis*)**].—*Ibid.* 139-141. 2 tables.

V. GARD, S. (1938). Berichtigung zu dem Artikel "Ein neuer Salmonella Typ (S. abortus canis)." [**Corrigendum to the Article "A New Salmonella, *S. abortus-canis*"**].—*Ibid.* 432.

VI. KAUFFMANN, F., & HENNINGSEN, E. J. (1939). **A New Type of Salmonella from Man and Dog.**—*Acta path. microbiol. scand.* **16.** 99-102. 2 tables. [In English].

I. Six persons living in three adjacent houses in Rakkestad, Norway, became ill with paratyphoid fever in March 1937. The isolated organism had the antigenic structure of a typical *S. paratyphi-B*. Milk was ruled out as a source of infection on account of the small number of persons involved, but a young dog was incriminated. It had been ill with paratyphoid-like symptoms for 14 days in February, and recovered just before the first human case occurred. Detailed bacteriological examination failed to isolate the organism from the dog, but its serum agglutinated suspensions of *S. paratyphi-B* to a dilution of 1:320 (" H ") and 1:40 (" O "). The isolated strain was also agglutinated, on one occasion to 1:1,280 (" H "); 13 days later the " H " suspension was agglutinated at 1:640 and the " O " suspension at 1:320. The sera of 23 other dogs were examined for agglutinins against paratyphoid antigens and none were observed. The source of the dog's infection was not found.

II. An annotation which refers to the report in I points out that previously paratyphoid fever had never been recognized in a dog. Reference is made to the Croydon typhoid inquiry when evidence was given to the effect that the typhoid bacillus may be found in human but not in animal excreta. The implications of the report from Norway are, however, limited by the differences in biological properties between *Salmonella typhi* and *S. paratyphi-B*.

III. A small epidemic of human paratyphoid occurred in February and March 1938 in a small woodland village in Sweden. Milk and water were ruled out as vehicles of infection and the horses, cows and goats of the area appeared healthy. A week before the outbreak occurred a stray dog arrived and apparently took up its abode in the house where the first human case appeared. Immediately after its arrival the dog became ill and gave birth to four dead puppies; later it had diarrhoea, and paratyphoid bacilli were isolated from its faeces. The serum of the dog agglutinated a suspension of the organism at a titre of 1:250, and the source of the infection is considered to be the dog.

IV. The bacteriology of the epidemic described in III was carried out by G., who isolated the organism from the faeces of the dog and from three of the four patients. The sera of the human beings and of the dog had agglutinins against this organism. The isolated bacillus is called *S. abortus canis* and it is noted that it is pathogenic for the dog and for man. The biochemical reactions are given and its antigenic formula is as follows :– IV, V, XII : bz_7z_8. It therefore belongs to Group B of the Kauffmann-White scheme, its O antigen being similar to *S. paratyphi-B* and its H antigen shows the IB phase variation, the I phase being also similar to the H antigen (specific) of *S. paratyphi B*.

V. This correction does not concern *S. abortus canis* and merely refers to the antigenic structure of *S. odense* which was incorrectly given.

VI. A description is given of an outbreak of gastro-enteritis involving six of a family of seven. At the same time, but probably not earlier, the dog of the family had been vomiting and looking unwell. The other domestic animals of the family, a cat and some hens, were not ill.

From the faeces of the seven persons (including one who was not ill) and from the blood of the dog an organism of the salmonella group was isolated. It is named *Salmonella glostrup* after the place where the patients live. The origin of the infection was not detected and it was assumed that the source of the infection of the dog and patients was the same. The antigenic structure of the new salmonella is as follows :– VI, VIII : z_{10}en. It belongs to Group C of the Kauffmann-White scheme, having a similar O antigen to *S. newport* and its H antigen shows the IB phase variation, the I phase being a new factor and the B phase being similar to but not identical with the H antigen of *S. abortus-equi*.

[These studies show that the dog must now be taken into consideration in an epidemic of human beings due to certain members of the salmonella group, for as is shown, the dog may in some cases be the apparent origin of an infection, whilst in others it may be infected at the same time and presumably from the same source as the human patients].—R. LOVELL.

STENERT, H. (1938). Ein Beitrag zur Epidemiologie des Bact. ent. Breslau. [**On the Epidemiology of** *Salmonella typhi-murium*].—*Tierärztl. Rdsch.* **44.** 656-658. 1 fig. [4 refs.]

An attack of enteritis in a bull found to be due to *S. typhi-murium* was traced to its origin in ducks and geese; the blood of three out of the 85 geese, of one out of the 26 ducks, and of two horses, and eight calves that shared the pasture contained agglutinins for the organism. It was recovered from mixed samples of faeces of the geese and ducks, and from those of the eight calves on the same pasture. The owner had often lost birds, and on at least one occasion *S. typhi-murium* had been recovered from the carcass. One of the calves was found to be a constant carrier of the organism, but none of them had specific agglutinins in the blood. [In view of the evidence given by S., it seems that the calves were just as likely to have been the source of infection as the waterfowl].—A. W. MÖLLER.

CASTELO, M., & SALSAMENDI, R. C. (1938). Salmonelosis epizootica en conejos. (Por Salmonela Typhi-murium). [**An Outbreak of** *S. typhi-murium* **Infection in Rabbits**].—*Bol. Direcc. agric. Ganad. Montevideo.* **22.** 10-21. 5 figs.

The authors report an epizootic of *S. typhi-murium* infection in a rabbitry of 800 rabbits, of which 749 died between December and March. The animals were kept under good hygienic conditions, but were overcrowded. The period of illness was only a few days, and the symptoms were anorexia, laboured respiration and general lassitude. Healthy rabbits died within 12 days after being introduced into the rabbitry. Preventive measures adopted are given. Vaccination with formolized bacterial suspension of *S. typhi-murium* or with formolized natural aggressin proved useless. Tests for anaerobes or a filtrable virus proved negative. Agglutination tests revealed the following antigens, according to the Kauffmann-White scheme:– IV, V : i : 1, 2. Agglutination tests were carried out on two vaccinated rabbits and their sera reacted to flagellar agglutinins at titres of 1:160 and 1:1,280 respectively; one out of six unvaccinated rabbits reacted at a titre of 1:2,560.

EDWARDS, P. R., & BRUNER, D. W. (1939). **Further Studies on Biochemical and Serological Varieties of** *Salmonella typhi-murium*.—*Amer. J. Hyg.* Sect. B. **29.** 24-31. 2 tables. [Numerous refs.]

The authors studied 203 cultures of *S. typhi-murium*, isolated from domestic and laboratory animals. They found that biochemical tests could be used to distinguish strains epidemiologically related. Cultures from an outbreak were all identical with regard to the Bitter tests and the presence or absence of the antigen I of the Kauffmann-White classification. Of the 53 cultures isolated from pigeons, all of which were IV variants, only eleven resembled the "ammonia-weak" type of Hohn and Herrmann. Of the 59 cultures lacking antigen V, 53 were isolated from pigeons, and three were isolated from rabbits in contact with infected pigeons.
—A. A. B. ELLIS.

JANSEN, J. (1937). Cultuurtypen van S. typhi-murium. [**Cultural Types of** *S. typhi-murium*].—*Tijdschr. Diergeneesk.* **64.** 624-629. 1 table. [15 refs.] [English, French and German summaries].

J. studied 46 strains of *S. typhi-murium* from domestic and wild animals. Using Simmons' medium and Hottinger's broth he obtained the following results :– 22 fermented dextrose, arabinose, dulcitol and rhamnose, 17 fermented all of these except rhamnose ; seven caused no change in $NaNH_3HPO_4$, in the ammonium phosphate medium of HOHN and HERRMANN [*V. B.* **8.** 498].—A. W. MÖLLER.

DIERCKING, K. (1937). Abänderung der Drigalski- Conradi- und der Gassner-Platte durch Saccharosezusatz. [**The Addition of Saccharose to Drigalski, Conradi and Gassner Culture Media**].—*Inaug. Diss., Hanover.* pp. 38. [15 refs.]

The addition of 3% saccharose to Drigalski-Conradi plates was found not to affect the differentiation between the *Salmonella enteritidis* group and the *Bact. coli* group (red colonies). When 54 strains of intermediate types difficult to distinguish on primary culture from the *enteritidis* group, and often occurring in normal carcasses in slaughter houses, were examined, 90% gave red colonies, thus showing their relationship with the *coli* group.—P. S. WATTS.

HEZEL, E. (1937). Die Bang-Infektion bei Mensch und Rind mit Berücksichtigung der Verhältnisse in Württemberg. [**Brucellosis in Man and Cattle in Wurttemberg**].—*Inaug. Diss., Munich.* pp. 22. 3 tables. [Numerous refs.]

Between 1929 and 1935, 56 cases of human infection were established clinically in Wurttemberg. The fact that 27 of these cases were agricultural workers and 6 were veterinary practitioners, is taken to indicate that direct contact with diseased animals is a more frequent source of infection than the consumption of raw milk or milk produce, to which only 10 cases could be traced.

Br. abortus cultures were killed when exposed to the direct action of human gastric juice for as short a time as five minutes. [No data are given for bovine brucellosis].

ZOTTNER, M. (1939). Les brucelloses animales. [**Animal Brucelloses**].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord, 1939.* **1.** 93-100.

Current problems connected with brucellosis in the various domestic animals are reviewed with reference to epidemiology, symptomatology, latent infection, differentiation of brucella species, relative value of agglutination and allergic tests, and prophylactic measures. The absence of brucellosis established by more than 1,000 blood aggl. tests in indigenous cattle herds in zones of infection was, in the opinion of the author, due to their open-air mode of life. The merits of the various antigens used in the allergic test are compared, and emphasis is laid on the need for standardization. The allergic test is stated to be less reliable than the agglutination test. T. considers that a lanoline vaccine gives good results.—R. O. MUIR.

MACHADO, A. de M. (1938). Brucelose em Portugal. Ensaios sorológicos, culturais e biológicos. [**Brucellosis in Portugal**].—*Bol. pec., Lisboa.* **6.** No. 1. 15-40. 11 tables. [Numerous refs.] [French summary p. 276].

This article covers the period 1930-1936. Of 2,006 agglutination tests of bovine serum for brucella, 9·2% were positive, but the incidence is lower in some districts in Portugal ; 15·5% of 618 tests on sheep and goats were positive, and 23·7% of 1,804 tests on swine.

The following conclusions are drawn :– the ratio between reactors and actual abortion is lower in swine than in cattle ; whey tests are often unreliable ; in 1933-1934, 4·9 % of milk samples supplied to Lisbon were infected, and g. pigs inoculated with bovine material frequently exhibited no lesions, though their blood-serum reacted ; this was never the case after inoculations with porcine material.—J. PASFIELD.

ALESSANDRINI, A. (1938). La diffusione della brucellosi in Italia, con particolare riguardo alla Provincia di Arezzo. [**Incidence of Brucella Infection in Italy with Special Reference to Arezzo Province**].—*Ann. Igiene* (*sper.*). **48.** 205-223. 1 graph, 1 chart, 1 map. [9 refs.]

A. reports that there is not a single region in the whole of Italy which is not affected with undulant fever. The greatest incidence occurs in Sicily, where about 30 % of the population are said to be infected. *Br. melitensis* is the cause of disease in the south, while both *melitensis* and *abortus* infections occur in the central and northern parts of the country. The disease flares up during the months of April, May and June, as during that time large flocks of sheep and herds of cattle are removed to new pastures, thus spreading the disease into the new places which they traverse. More fresh cheese is consumed during spring, and it is in spring also that most abortions occur. Investigations were carried out in Arezzo, where the incidence of U.F. is very high, particularly in spring. Horses, dogs, deer and wild boar can become infected and spread the disease to man, as well as bovines, sheep, goats and pigs. Another fruitful source of infection is manure soiled with urine of infected goats, and such manure should not be used to fertilize vegetables. —A. J. CASSAR.

PARSCHAU, J. (1937). Untersuchung über Beziehungen zwischen den Abortusfällen, den Milchleistungen und den verwandtschaftlichen Verhältnissen in Rinderherden. [**Relation between Abortions, Production of Milk, etc. in Cattle**].—*Inaug. Diss., Berlin.* pp. 15. 1 table, 1 chart. [9 refs.]

In 43 herds the histories of 5,404 cows were examined for records of abortion. The milk yields of 1,305 cows which had aborted were compared with those of the herd as a whole ; it was found that the yields of these cows were evenly distributed above and below the mean of the herd, and the conclusion drawn is that abortion has no influence on the milk yield of a cow.—P. S. WATTS.

KÄSTLI, P., & SAXER, E. (1938). Beobachtungen über den Verlauf der Rinderabortus Banginfektion in einem frischverseuchten Milchviehbestand. [**The Course of Brucellosis in a Newly-Infected Dairy Herd**].—*Schweiz. Arch. Tierheilk.* **80.** 530-542. 1 table. [4 refs.]

A conventional article.—V. CHLÁDEK (PRAGUE).

MARBACH, H. (1938). Die Steriälittsbekämpfung bei Kühen, die mit Abortus Bang infiziert sind. [**Control of Sterility in Brucella-Infected Cows**].—*Dtsch. tierärztl. Wschr.* **46.** 690-692.

M. states that sterility is often due to brucellosis. He speaks of the difficulty of eradicating the infection, but apparently without appreciating what can be done. He states that the results of sterility-treatment in positive reactors are successful in only 34 % of cases, whereas in non-reactors 68 % of cases can be treated successfully ; he suggests that sterile positive reactors should not be treated, but should be destroyed.—V. CHLÁDEK (PRAGUE).

HOPPE, R. (1938). O zmianach histologicznych w nerkach płodów przy brucellozie bydła. [**Histological Lesions of the Kidneys of Bovine Foetuses in Cows with Brucellosis**].—*Wiad. weteryn.* **17.** 81-105. 5 figs. [Numerous refs.] [German summary].

Interstitial non-purulent nephritis detectable only on microscopic examination may be found in foetuses of brucella-infected cows. In the early stages there is an increase in the numbers and size of the capillary endothelial cells, and a diffuse infiltration of the interstitial spaces (especially in the cortex) by lymphocytes and histiocytes. Later, similar infiltrations appear in the interstitial spaces of the deeper tissues. As the disease progresses more centres of infiltration appear, and all increase in size. These changes correspond to those observed by LÜBKE [*V. B.* **5.** 545.] in calves' kidneys and by BENDINGER [*V. B.* **6.** 315.] in sheeps' kidneys, described as " white spotted kidneys " (" nephritis maculosa alba ") and evidently attributable to this disease. In the latter-mentioned condition, apart from the similar microscopic changes, there were also macroscopic centres of infiltration.—V. CHLÁDEK (PRAGUE).

HEINEN, A. (1938). Untersuchungen über das Vorkommen der Abortusinfektion bei Schlachtkälbern unter besonderer Berücksichtigung der sogennanten wiessen Fleckniere. [**Investigations on the Occurrence of** *Brucella abortus* **Infection in Slaughter Calves, with Special Reference to the So-Called White Spotted Kidneys**].—*Inaug. Diss., Berlin.* pp. 17. [Numerous refs.]

Material from nine calves with white spotted kidneys, was examined culturally and by animal inoculation. In no case was any evidence of *Br.a.* infection encountered.—P. S. WATTS.

I. LISBONNE, M. (1939). Epidémiologie de la fièvre ondulante. [**Epidemiology of Undulant Fever**].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord, 1939.* **1.** 5-9. [6 refs.]

II. BURNET, E., & BALOZET, L. (1939). Epidémiologie des brucelloses en Tunisie. [**Epidemiology of Brucellosis in Tunis**].—*Ibid.* 11-17. 2 figs., 1 table. [10 refs.]

III. BURNET, E., & BALOZET, L. (1939). Prophylaxie des brucelloses en Tunisie. [**Prophylaxis of Brucellosis in Tunis**].—*Ibid.* 119-121. [1 ref.]

IV. FORT, & ZOTTNER. (1939). Epidémiologie des brucelloses au Maroc. [**Epidemiology of Brucellosis in Morocco**].—*Ibid.* 19-25. 1 map.

V. FORT, & ZOTTNER. (1939). Prophylaxie des brucelloses au Maroc. [**Prophylaxis of Brucellosis in Morocco**].—*Ibid.* 123-127. [1 ref.]

VI. MERCIER. (1939). Epidémiologie de la fièvre de Malte en Algérie. [**Epidemiology of Malta Fever in Algeria**].—*Ibid.* 27-39. 3 charts, 2 maps.

I. An account is given of the distribution and spread of undulant fever in Southern and Central France since 1925, with an estimate of an annual incidence as 3,000-4,000 cases. The causative bacteria isolated by blood culture were classified as *Br. melitensis* (94%) and *Br. abortus* (6%). The authors did not encounter *Br. suis*. The goat and sheep are the chief reservoirs of *Br.m.* infection in Southern France, but *Br. melitensis* has been recovered from cows' milk and undulant fever patients in odd areas elsewhere in the country. An instance is stated of the isolation of two *Br.m.* and two *Br.a.* strains from four cows on the same farm in Belgium in the region of Namur. The paths of excretion in animals and of infection in man are described, and variation in incidence of infection is correlated with season, occupation, age and sex.

II. 3·3-9·7% of dairy goats, both native and Maltese, in Tunis and its

suburbs, were found to be infected with *Br.m.*, compared with a negligible incidence in rural districts. *Br.m.* was not detected in cows or sheep in districts where infection was prevalent in man and goats. Natural infection with *Br.m.* was found in two g. pigs and three house rats. *Br.a.* has not been found in goats or sheep. *Br.a.* infection in dairy cows was considered to be due to importation, since only 1·7% of native cows were infected, compared with about 50% in herds to which European cattle had been added. Undulant fever in man due to *Br.m.* and *Br.a.* was definitely associated with the consumption of dairy produce derived from infected goats and cows.

III. The authors suggest that *Br.m.* infection could be eliminated from Tunis by adding agglutination tests for goats, prohibition of the sale of the milk of positive reactors and obligatory slaughter of infected goats to the present prophylactic measures of compulsory notification of undulant fever, hygienic methods of milk production and prevention of the importation of Maltese goats. The introduction of suitable prophylaxis against *Br.a.* infection is recommended in the form of prohibition of the importation of positive reactors, encouragement of periodic agglutination tests in dairy herds and the slaughter of infected animals.

IV. Infection of both man and animals in Morocco by either *Br.m.* or *Br.a.* is regarded by the authors as infrequent. The distribution of *Br.m.* infection is limited to regions in the interior where goats and sheep are reared. *Br.a.* infection is mainly limited to the coastal zone where dairy cattle are bred and is not associated with disease in man. 800 sera from cows, sheep and goats, some collected at an abattoir and the remainder at random, were negative to the agglutination test for brucella infection. In the opinion of the authors, brucellosis is rare and this is due to strict importation regulations and energetic prophylaxis.

V. Prophylaxis against brucellosis in Morocco is described under the headings :– prevention of the importation of infected animals ; slaughter of infected animals and control of animals in regions of known infection, and vaccination of healthy animals. Regulations are given governing the importation of goats and cows. Serological and allergic tests are suggested for determination of the extent of infection amongst animals in regions where undulant fever exists in man. An account follows of the satisfactory results obtained in 800 sheep and goats and in 1,000 cows by the use of lanoline vaccine.

VI. The endemicity and periodic epidemicity of Malta fever in Western Algeria is due to the fact that 80% of the milk produced in the endemic region is derived from the goat, which is recognized as the chief animal reservoir of *Br.m.* Examination of the milk of 1,500 goats in the district of Oran revealed that less than 4% were infected. Sheep were not incriminated as carriers but in one epidemic horses were recognized as the source of infection in several instances. Examples are given of infection of imported dairy cows by contact with goats. The ingestion of goats' milk and its derivatives, contact of goat-herds with infected animals, and indirect contact are regarded as the chief ways of human infection.

—R. O. Muir.

I. Lisbonne, M., & Roman, G. (1939). L'identification des brucella. [**Identification of Brucella**].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord, 1939.* **1.** 41-51.

II. Duffau, E. (1939). Diagnostic bactériologique des brucelloses. [**Bacteriological Diagnosis of Brucellosis**].—*Ibid.* 53-63.

I. The authors describe in detail the criteria for the recognition of the genus *Brucella* and stress the importance of the use of a high titre brucella antiserum for final identification. The differential characters of the three *Brucella* species are

enumerated according to the methods of Huddleson and of de Sanctis, *viz*, culture in the presence of 10% CO_2, rate of H_2S production and the bacteriostatic action of thionin, basic fuchsin and egg-albumin. The fixity of these properties is demonstrated after sub-culture in various media resulting in transition from S to R form and in alteration of agglutinability by heat, acid or trypaflavine. Of 1,149 brucella strains submitted to Huddleson's tests, only 3% could not be definitely classified. So-called *paramelitensis* and *para-abortus* strains, isolated mainly from blood samples with high agglutinating titres, were regarded as R variants, the frequency of which can be determined by Burnet's heat agglutination method. There follows a description of the methods of preparation of the media used in the specific differential tests.

II. The isolation of brucella species from internal organs, blood and other body fluids is described with details of selective media, sampling methods and optimum cultural conditions. Haemoculture proved positive in 72% of 1,190 cases of undulant fever. The intradermal test is discussed with reference to preparation of antigen, technique of inoculation and interpretation of reaction. The specificity of the test is demonstrated in a study of the intradermal reactions in 21 cases of undulant fever and in 60 cases of disease other than undulant fever. The complement-fixation and flocculation tests are briefly described. Nine of eighteen sera from cases of brucellosis gave negative complement-fixation tests.
—R. O. Muir.

Witzigmann, J. (1938). Hämatologische Untersuchungen beim Tetanus des Pferdes. [**The Blood Picture in Tetanus in Horses**].—*Tierärztl. Rdsch.* **44.** 585-591. 10 tables. [10 refs.]

The blood of ten cases, six of which were fatal, was examined at various stages of the disease, mostly before treatment was given. In the animals that recovered, there was only a slight decrease of red and white corpuscles; in the fatal cases there was an increase of erythrocytes and a rise in the haemoglobin content in the final stage. Marked leucocytosis was a sign of impending secondary pneumonia in these cases. Specific antiserum did not alter the white cell count, but 3% phenol had this effect, causing it to return to normal.—V. Chládek (Prague).

Gelz, H. J. (1939). Ueber die Indikation der passiven, simultanen, und aktiven Schutzimpfung gegen Tetanus. [**The Indications for Passive, Simultaneous, and Active Preventive Inoculation for Tetanus**].—*Tierärztl. Rdsch.* **45.** 424-427. [Numerous refs.]

G. discusses the preparation of tetanus antiserum, formol toxoid, and alum-precipitated formol-toxoid. He speaks of successful results in horses with a precipitated formol toxoid, apparently sold under a trade name: one treatment (two doses at an interval of 3-4 weeks) is said to have given immunity for a year and a further injection at the end of that time to increase the period for a further five years. Where injuries are extensive and healing delayed, the immunity following serum injection may not be sufficient, and a simultaneous injection of serum and of the toxoid is recommended, immunity being later reinforced by a further injection of toxoid alone.—H. E. Harbour.

Pyle, N. J., & Brown, R. M. (1939). **Botulism in Foxes.**—*J. Amer. vet. med. Ass.* **94.** 436-439. 3 tables. [2 refs.]

A description is given of the method employed to ascertain the cause of a fatal outbreak of disease on a fox-farm where the contents of blown cans of fish had formed part of the diet of the animals. *Clostridium botulinum* could not be

isolated, but the presence of its toxin [presumably type A] was demonstrated. —G. WILLIAMSON.

POZERSKI, E., & GUELIN, A. (1939). Etude des pouvoirs gélatinolytiques comparés de différents types et de différentes souches de *Bacillus perfringens*. [**Gelatinolytic Power of Different Types and Strains of** *Clostridium welchii*].—*C. R. Soc. Biol. Paris.* **130.** 514-516. [1 ref.]

Chamberland L3 filtrates of 24-hour glucose-broth cultures of 21 strains of *Cl. welchii* were added in quantities of 0·5 c.c. to amounts of 2 c.c. of sterile 2% gelatin, with the addition of five drops of toluol. These mixtures, after heating to 40°C. until liquid, were held for varying times at 37°C., before being cooled in ice so that liquefaction could be observed. The strains ranged from those whose filtrates caused complete liquefaction within 2-3 hours to those with little or no gelatinolytic power in 24 hours. A classification on these grounds was found to bear no relationship to the usual typing of the organism. The strains used included one type "A" and several of each of the other types.—H. E. HARBOUR.

I. PUNTONI, V. (1937). Moderne concezioni sulla sistematica degli attinomiceti. [**Classification of the Actinomycetes**].—*Atti VI Congr. naz. Microbiol., Milan. 1937.* pp. 17-51. [Numerous refs.]

II. REDAELLI, P. (1937). La biologia dei miceti parassiti dell'uomo ed il suo valore ai fini della sistematica. [**Biology of Mycetes Parasitic in Man**].—*Ibid.* pp. 53-90. [Numerous refs.]

III. BALDACCI, E. (1937). Il concetto di specie negli attinomiceti ai fini della classificazione e della determinazione. [**The Species of Actinomycetes and Their Classification**].—*Ibid.* pp. 90-98. [Numerous refs.]

I. P. discussed the classification of actinomycosis organisms and suggested that they may be conveniently subdivided into the following three genera :—(1) *Actinomyces* Harz 1837, as emended by PUTONI and LEONARDI 1935, for the aerobic forms with long filaments (hyphae), producing in culture a fructifying aerial mycelium (Puntoni's actinospores)—type species *A. albus* (Rossi-Doria) ; (2) *Asteroides* Puntoni and Leonardi 1935 for the aerobic forms with shorter filaments, not producing a fructifying aerial mycelium in culture—type species *A. asteroides* (Eppinger), and (3) *Actinobacterium* Haass 1906 (= *Cohnistreptothrix* Pinoy 1913) for the anaerobic forms with bacilliform elements—type species *A. israeli* (Kruse). These three genera (Latin diagnoses of which are appended) are stated to correspond respectively to the sections *Majores*, *Minores*, and *Breviores* of certain previous authors, *e.g.* BRUMPT [*V. B.* **7.** 310.], LANGERON [(1922). *Nouveau Traité de Med.*, Paris : de Roger, Widal et Teissiet], and others. In his opinion, the existing confusion in the nomenclature of the species of Actinomycetes is mainly due to the fact that species were hitherto frequently created on medical (clinical and anatomo-pathological) rather than on botanical grounds ; this has led to the inclusion of greatly different forms in one and the same species, while entirely identical forms have frequently been described under different names. Thus, for instance, strains of *A. sulphureus* Gasperini, *A. albus* (Rossi-Doria), *A. chromogenus* Gasperini, *A. albido flavus* (Rossi-Doria), and *A. carneus* (Rossi-Doria), isolated from bovine and human actinomycoses, have all been referred to *A. bovis*. For these reasons a thorough revision of all the existing species is strongly advocated.

P. considers further that the division of the Actinomycetes into two sections, *Parasitica* and *Saprophytica* is not acceptable, inasmuch as the sporadic nature of actinomycotic infections strongly suggests that these pathological conditions arise

from the accidental development in animal or human tissues of saprophytic organisms commonly and widely present in the environment. While this suggestion is stated to have been fully confirmed by ROSSI-DORIA (1891) and GASPERINI (1890) in respect of actinomycoses due to the aerobic forms belonging to the genera *Actinomyces* and *Asteroides*, the origin of the infections caused by the anaerobic forms is still obscure; P. says, however, that he has recently demonstrated that the well-known intestinal saprophyte *Bacterium bifidum* is identical in its morphological, cultural and biological characteristics with *Actinobacterium israeli* (Kruse).

II. R. states that the results up to date of work initiated in 1923 indicate that while certain biological properties *in vivo* and *in vitro* of mycetes pathogenic to man and animals are sufficiently constant and significant to be used in the classification and nomenclature of these organisms, alone they have no absolute value as grounds for classification, and must be considered in conjunction with, and in relation to, the morphological and other characteristics of the mycetes. He believes, however, that in some cases certain biological properties (*e.g.*, microaerophilia) may be used to characterize systematic groups higher than the species, as is already practised in respect of the Schizomycetes. In his opinion a greater degree of uniformity and homogeneity in the nomenclature of taxonomic units below the species might be attained by the adoption for the mycetes of the trinomial system, as already accepted by zoologists and also by the American Code of Botanic Nomenclature.

III. B. illustrates by some concrete examples the extreme confusion now existing in the classification and nomenclature of the Actinomycetes, which he attributes chiefly to the diversity of the criteria used by previous authors in establishing their taxonomic units. He strongly advocates a thorough revision of all the species described hitherto, and suggests that the new classifications should be established on the following criteria :– (1) morphological characteristics, which in his opinion have an absolute value (with the exception of biometrical details, which should, however, be noted) for the establishment of the species; (2) cultural characteristics, with due consideration of factors such as pleomorphism *sensu lato*, ageing, pathogenic derivation, and the like, which may lead to the development of variants, and (3) biochemical properties, which should be studied in their complex by standardized methods. The value of the pathogenicity of the organisms as a criterion is still under discussion, and requires further investigation. The substrate from which the mycete is isolated is not considered to be of systematic significance.

B. does not accept the reference by PUTONI and LEONARDI of *Actinomyces asteroides* to the new genus *Asteroides* [see I, above]; he suggests for it the name *Proactinomyces asteroides* (Epp.) Bald. n. comb.

GRIGORAKI, L., & DAVID, R. (1938). Caractères biochimiques des champignons des teignes. [**Biochemical Characteristics of the Ringworm Fungi**].—*C. R. Soc. Biol. Paris.* **128.** 889-891. [2 refs.]

The authors studied the biochemical characters of two non-pleomorphic species, *Trichophyton crateriforme* and *Achorion violaceum*, and describe variations :– (1) action on milk due to the presence of a casein-splitting enzyme at 20°C.—*T.c.*, digestion commencing in 4 days and complete in 19 days; *A.v.*, digestion commencing in 7 days and complete in 40 days: (2) liquefaction of gelatine, due to an endotryptase, on 7 mm. layers of medium in Erlenmeyer flasks at 18°C.—*T.c.*, 1 cm. diameter liquefaction in 6 days; *A.v.*, 1 cm. diameter liquefaction in 3 days: (3) hydrolysis of saccharose, due to an invertase, upon a 10% solution in yeast water at 25°C. after 21 days—(a) rotation of the solution, *T.c.*, 1·15 and

A.v., 1·20, (b) reducing enzyme (g. per litre), *T.c.*, 2·05 and *A.v.*, 2·60 : (4) fermentation of 8% solution of glucose at 20°C. for 4 days and then at 35°C. for 4 days—*T.c.*, 11 small bubbles of CO_2 ; *A.v.*, nil : (5) maximum growth temperature—*T.c.*, 45°C. ; *A.v.*, 43°C. : (6) optimum temperature—*T.c.*, 35°C. ; *A.v.*, 35°C.—C. V. WATKINS.

HART, L. (1937). **A Short Note on the Occurrence in New South Wales of Mycosis in Turkeys, Geese and Fowls due to Aspergillus fumigatus.**—*Vet. Res. Rep., Dep. Agric. N.S.W. 1937.* pp. 76-77. [4 refs.]

H. records the loss of 50 turkeys in a flock of 300 due to infection with *A. fumigatus*. The same parasite was found in geese and in one domestic fowl. He stresses the low incidence of this disease in poultry in Australia as compared with European countries and America, and attributes it to the different climate and the system of management which provides a sunny environment not favourable to the growth of the fungus.—T. S. GREGORY.

DISEASES CAUSED BY PROTOZOAN PARASITES

SALHOFF, S. (1938). " Schwarzkopfkrankheit " auch beim Birkwild. [**Blackhead in a Black Cock**].—*Berl. tierärztl. Wschr.* Jan. 28th. 49-50. [4 refs.]

Blackhead was diagnosed in a wild black cock. The findings at autopsy were typical ; the caecum was very much swollen and distended, and there were flat or sharply circumscribed circular ulcers in the mucous membrane, which had led to perforation of the intestinal wall. The changes in the liver were not clearly marked.—SASSENHOFF (MUNICH).

LAFAYE, SAUNIÉ, & HOLSTEIN. (1938). Quatre cas de leishmaniose dans la région parisienne. [**Four Cases of Canine Leishmaniasis near Paris**].—*Rec. Méd. vét.* **114.** 657-659.

A four-year-old Irish setter, which had lived on the Mediterranean coast, was affected with what appeared to be piroplasmosis and sarcoptic mange. Examination of the blood revealed no piroplasms, but leishmania bodies were found in sections of sound skin taken from an area of old cicatrized ulcers. The formol-gel test was positive, the intensity of reaction progressively diminishing as the dog recovered ; 35 injections of anthiomaline were given during 14 weeks. Three other cases were found and were destroyed.—M. L. BINGHAM.

CURASSON, G. (1939). Sur la classification et la determination des trypanosomes pathogeneses de l'A.O.F. [**Classification and Identification of the Pathogenic Trypanosomes of French West Africa**].—*Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 2. 19-21.

The study of trypanosomes in Africa may be divided into three periods, in the first of which any slight morphological variation or even geographical distribution was sufficient for the creation of a new species. In the second period some doubt arose as to the validity of these species, but the majority of them were retained as the evidence was not sufficient to refute the early findings. In the third period the multiplicity of species was attacked, and although some variation was admitted it was ascribed to strains rather than species. Biologically this simplification was justified by the finding that strains might be modified in the process of fly transmission or by residence in a different mammalian host.

It is now claimed that the species existing in French West Africa can be

reduced to the two monomorphic species *Trypanosoma congolense* and *Tryp. vivax*, and the two polymorphic species *Tryp. brucei* and *Tryp. evansi*. *Tryp. congolense* can usually be distinguished from *Tryp. vivax* by its smaller size, but since small strains of *Tryp. vivax* exist, the fact that the kinetoplast in *Tryp. congolense* is marginal, and in *Tryp. vivax* terminal, is often an aid in reaching a decision. *Tryp. brucei* can be distinguished from *Tryp. evansi* by the fact that the forms without a free flagellum are much more numerous. [*Tryp. evansi* is usually regarded as a monomorphic species in which all the individuals possess a free flagellum].—U. F. RICHARDSON.

JAUFFRET, R. (1939). Contribution à l'étude du surra des bovidés au Cambodge. [**Bovine Surra in Cambodia, Indochina**].—*Rec. Méd. vét. exot.* **12.** 5-14.

Anti-rinderpest vaccination precipitated latent infection with *Trypanosoma evansi* in 24 out of 4,668 apparently healthy cattle for export. Appearance of the parasites in peripheral blood some days after vaccination was preceded by a rise in temperature. Subcutaneous injection of 2 g. of naganol in 20 c.c. of water effected an immediate fall in temperature and apparently cured the animals. In four cases the efficiency of the cure was subsequently verified by experimental inoculation of goats with blood from the previously treated animals.

An outbreak of surra in horses was shown to be of bovine origin, the parasite having probably been transmitted mechanically by biting flies. Naganol in doses of 1·5-2 g. in horses of about 150 kg. was effective if given early in the course of the disease. In practice two such doses were given at an interval of eight days. —H. E. HARBOUR.

I. CULBERTSON, J. T. (1939). **The Immunization of Rats of Different Age Groups against *Trypanosoma lewisi* by the Administration of Specific Antiserum per os.**—*J. Parasit.* **25.** 181-182. 1 table.

II. CULBERTSON, J. T. (1939). **Transmission of Resistance against *Trypanosoma lewisi* from a Passively Immunized Mother Rat to Young Nursing upon Her.**—*Ibid.* 182-183. 1 table.

I. Rats of 10, 15, 20, 40, and 60 days of age were given *per os* antiserum prepared against *Tryp. lewisi*, the dose being repeated on five successive days. C. found that rats could be immunized throughout the stage prior to weaning period (21 days), though with progressively less effect after weaning. [For previous work see *V. B.* **9.** 12].

II. Young rats, nursed on a mother rat immunized with immune serum immediately after delivery, showed a considerable degree of protection against subsequent experimental infection with *Tryp. lewisi*, while the mother was still protected by the serum. A control group was nursed on a mother injected with normal serum only. At birth, three of the young of one mother were exchanged with three of those of the other mother.—M. L. BINGHAM.

ROUBAUD, E., & PROVOST, A. (1939). Sensibilité du lapin au trypanosome des ruminants des antilles, *Tr. viennei*, souche américaine de *Tr. cazalboui* (*vivax*). [**Susceptibility of Rabbits to *Tryp. viennei*, the American Strain of *Tryp. vivax***].—*Bull. Soc. Path. exot.* **32.** 553-559. 3 figs. [5 refs.]

The susceptibility of the rabbit to *Tryp. vivax* is discussed, and it is pointed out that though successful inoculation has been recorded, results have been rather irregular. Working with the American strain of this trypanosome, the authors succeeded in infecting rabbits when they used blood from a goat which had been recently infected, but failed when they used blood from an animal in the later

stages of infection. The trypanosomes were never numerous in the blood of the rabbits, and infections were usually very fleeting. Rabbits which appeared to have overcome the infection could be reinfected.—U. F. RICHARDSON.

ROUBAUD, E., & PROVOST, A. (1939). Arrêts de croissance au cours d'infections à *Trypanosoma gambiense* chez la souris. [**Growth Inhibition of Mice during** *Tryp. gambiense* **Infection**].—*Bull. Soc. Path. exot.* **32.** 387-390. 2 figs., 1 table.

A strain of *Tryp. gambiense* collected in the Cameroons gave very unusual reactions when inoculated into young mice in that the animals might live for several months with only rare appearances of trypanosomes in the blood. The infected mice failed to develop normally, and in one animal, which lived for over six months after infection, the weight was only 9 g. against a normal weight of 20 g.—U. F. RICHARDSON.

ACOSTA, J. L., & ROMANA, C. (1938). Infección del murciélago Desmodus rotundus (E. Geoffroy) por Trypanosoma equinum (Elmassiani) y trasmisión del " Mal de caderas " por su mordedura. [**Infection of** *Desmodus* **Bats with** *Trypanosoma equinum* **and Transmission of the Disease by Bat Bites**].—*Mem. Inst. Osw. Cruz.* **33.** 291-295. [1 ref.]

The blood-lapping bat *Desmodus rotundus* becomes infected by feeding on horses with *Trypanosoma equinum* infection and may transmit the disease to horses and g. pigs by its bites. The survival of infected bats, which show no symptoms and may harbour trypanosomes for a long time (3 months), as shown by experimental inoculations with their blood, lead the authors to suspect that the bats may act as true " reservoirs " of the parasite. The disease transmitted by bats that had been experimentally infected, did not show any difference from the natural disease.—S. TORRES.

GEMETRO, L. (1937). El mal de caderas en la frontera norte argentina. [**Equine Mal de Caderas** (*Trypanosoma equinum* **Infection**) **at the Northern Frontier of Argentina**].—*Rev. Med. vet., B. Aires.* **19.** 369-395. 6 figs., 1 graph, 2 maps.

G. traces three stages of the condition :– (1) the nervous phase, characterized by hyperpyrexia, dyspnoea and debility ; (2) the phase of incoordination, lasting 12-20 days, and (3) the chronic phase, with normal temperature, icterus and lethargy, lasting in some mules more than a year. Prophylactic treatment is given with " Bayer 205 " in diminishing doses (2·50 g., 2 g., and 1·5 g.) at six-week intervals commencing in early March. This product has little value as a curative agent. Other measures adopted by the author were the substitution of Sudan grass and alfalfa for local fodder, drinking from running water, and the provision of remount ranches on high ground.—J. PASFIELD.

ŘEŘÁBEK, J. (1936). K pathogenesi experimentálních trypanosomiasí u drobných laboratornich zvířat. [**Pathogenesis of Experimental Trypanosomiasis in Small Laboratory Animals**].—*Biol. Spisy Vys. Šk. Zvěrolék. Brno.* **15.** 89-122. 5 figs. [Numerous refs.] [German summary].

The author reports on *T. equiperdum* and *T. brucei* infection in g. pigs. By g. pig passage the virulence of both strains decreased, but it was raised again by rat passage. After two years' passage in g. pigs the virulence had decreased so much that g. pigs infected with this passage strain contracted mild illness.

The author discusses the factors that determine the severity of the disease process when laboratory animals are infected with pathogenic trypanosomes. —E. PŘIBYL (BRNO).

HOARE, C. A. (1938). **Development of Mammalian Trypanosomes in the Body-Cavity of Caterpillars.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 8-9. [4 refs.]

Attempts to cultivate mammalian trypanosomes in caterpillars were unsuccessful, except in the case of *Trypanosoma cruzi.* In this case the trypanosomes which survived underwent the typical developmental stages as seen in their normal intermediate hosts and in artificial cultures.—M. L. BINGHAM.

I. PALLASKE, G., & VOLKMANN, A. (1938). Erfahrungen mit der Trichomonadenseuche in einer Gemeinde. [**Experience of Bovine Trichomoniases**].—*Tierärztl. Rdsch.* **44.** 170-174.

II. BELLER, K., SCHAAF, J., & SCHERLE, H. (1938). Die Pathogenität der Geschlechtstrichomonaden des Rindes. [**Pathogenicity of Bovine Genital Trichomonads**].—*Arch. wiss. prakt. Tierheilk.* **73.** 171-187. 1 table. [15 refs.]

I. A general clinical article in which the role of the bull in spreading the disease is referred to. Rivanol and entozon irrigations were found useful for curative purposes.

II. A young bull was successfully infected with trichomonads by a series of intrapreputial injections of culture, and by causing it to serve an infected cow. The bull then transmitted the infection to heifers, but even at this time it was very difficult to demonstrate the presence of trichomonads in the genital organs of the bull. It is therefore suggested that in order to diagnose trichomoniasis in bulls it is advisable to cause them to serve uninfected cows and to examine the latter for the parasites after they have had time to contract infection.

A number of cows were infected *per vaginam* by trichomonad cultures and the course of infection was studied. It was found that the organisms entered the uterus and ceased to be demonstrable in the vaginal secretion. Abortion only occurs when there is a massive infection causing macroscopic changes in the uterus, foetal membranes and foetus. Trichomoniasis may coexist with genital vesicular exanthema in an animal [see *V. B.* **5.** 487].—V. CHLÁDEK (PRAGUE).

HEGNER, R., & ALICATA, J. E. (1938). **Trichomonad Flagellates in Facial Lesions of a Pig.**—*J. Parasit.* **24.** 554.

Many trichomonads, together with *Pseudomonas pyocyaneus* and *Actinomyces,* were found in necrotic tissue underlying bilateral facial thickenings in a young pig. It is suggested that buccal flagellates invaded the necrotic tissue, which extended close to the facial bones, where they found suitable conditions for growth and reproduction. The cause of the lesions was not ascertained.—M. L. BINGHAM.

HOGUE, Mary Jane. (1938). **The Effect of** *Trichomonas foetus* **on Tissue Culture Cells.**—*Amer. J. Hyg.* **28.** 288-298. 6 figs. on 3 plates. [12 refs.]

Little is known of the effect of *T.f.* on the tissues of the host. The experiments describe its effect on tissue culture cells. The organism was found to produce a substance which kills the tissue cells, and filtrates of a 17-day-old culture killed the tissue culture cells as quickly as the living organism. Heating at 55°C. for 15 minutes only slightly lowered the toxicity. The tissue culture cells react to *T.f.* (1) by becoming granular and dying fairly quickly, (2) by forming vacuoles and dying more slowly, or (3) by contracting.—S. J. GILBERT.

GIBBONS, W. J., & BAKER, D. W. (1939). **Coccidiosis [in Cattle].**—*Cornell Vet.* **29.** 182-191. 1 fig., 1 table.

The authors record ten outbreaks of coccidiosis affecting 44 cattle, of which 13 died. Statistics show that there was a marked increase in the number of cases in New York State in 1937-1938. Details are given of the clinical symptoms, results of faecal examinations, and of P.M. examinations. Treatment included the administration of intestinal disinfectants and astringents, and, in very severe cases, intravenous injections of 500-1,000 c.c. of citrated blood and 1,000-2,000 c.c. of 5% dextrose in normal saline; rectal injection of warm mineral oil, together with epidural anaesthesia to permit the retention of the oil, was useful for the relief of tenesmus. Seven of the outbreaks occurred on immediately adjacent farms, and the topographical features of the area are discussed in relation to the possible means of spread of the infection, as surface drainage appears to have played an important part in transmission.—M. L. BINGHAM.

I. YAKIMOFF, W., & TIMOFEIEFF, P. (1939). Inclusion dans les oocystes d'*Eimeria labbeana* Pinto, 1928. [**Inclusion Bodies in the Oocysts of** *E.l.*] —*Bull. Soc. Path. exot.* **32.** 283-284.

II. YAKIMOFF, W., & TIMOFEIEFF, P. (1939). Sur la sporulation anormale d'*Eimeria labbeana* Pinto, 1928. [**Abnormal Sporulation of** *E.l.*]—*Ibid.* 284-285.

I. Records the detection of motile micro-organisms resembling bacteria in the sporulating oocysts of *E.l.* between the membranes of the oocyst wall and the protoplasmic contents. In some cases the organisms invaded the protoplasm. These inclusions were not detected in oocysts sporulated in solutions of potassium bichromate.

II. Discusses the records of abnormal sporulation in such species as *Isospora rivolta* and *I. felis*, and reports the detection of oocysts of *E.l.* of the pigeon in which there were only two sporocysts each containing four sporozoites. The authors are convinced that the oocysts were not those of an *Isospora*.—U. F. R.

BECKER, E. R., & WATERS, P. C. (1939). **Dried Skim Milk and Other Supplements in the Ration During Caecal Coccidiosis of Chicks.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 439-442. [2 refs.]

BECKER has shown [*V.B.* **9.** 176] that powdered skim-milk in certain formulae for chick rations seems to have coccidium-stimulating properties. Experiments on the effects of buttermilk were also conducted by the authors who showed that dried milk in the ration had an unfavourable effect upon the course of experimental caecal coccidiosis. The present paper affords further evidence which reveals the unfavourable effect of dry buttermilk in the ordinary growing ration and that dry skim-milk has a similar effect. Little difference in mortality or weight gain was noted when soya bean meal was substituted for a large part of the meat element in scraps, or when sardine meal took the place of dry milk. —C. HORTON SMITH.

I. WOLFSON, F. (1938). **The Common Duck as a Convenient Experimental Host for Avian Plasmodium.**—*Amer. J. Hyg.* **28.** 317-320. 1 table. [4 refs.]

II. HEWITT, R. (1938). **Multiple-Infected Red Cells in Avian Malaria.**—*Ibid.* 321-344. 3 text figs., 20 figs. on 1 plate, 7 tables. [19 refs.]

III. HEGNER, R., & ESKRIDGE, Lydia. (1938). **Passive Immunity in Avian Malaria.**—*Ibid.* 367-376. 2 figs. [4 refs.]

IV. MANWELL, R. D. (1938). **The Identification of the Avian Malarias.**—*Amer. J. trop. Med.* **18.** 565-575. 1 table. [Numerous refs.]

V. JAMES, S. P., & TATE, P. (1938). **Exo-Erythrocytic Schizogony in *Plasmodium gallinaceum* Brumpt, 1935.**—*Parasitology.* **30.** 128-139. 18 figs. on 2 plates. [Numerous refs.]

I. W. showed that a strain of *Plasmodium cathemerium* isolated from a wood thrush could be transmitted to a 3-days-old duck as well as to a canary, and that blood from this duck was infective when sub-inoculated into normal ducks and canaries. He concludes that the duck may serve as a convenient host for experiments on bird malaria.

II. H. refers briefly to the theories suggested by various workers to explain the presence of multiply-infected red cells in malarial infections; his observations support the theory that penetration by merozoites is into specially "susceptible" young cells. The asexual cycle of *Plasmodium cathemerium* lasts for 24 hours; for the first 12 hours he found that the number of multiply-infected cells gradually increased, but as the cycle progressed, they rapidly diminished in number until after 20 hours no cells contained more than two parasites, and the majority contained only one. The frequency of multiply-infected cells was proportional to the ratio between the number of parasites and the number of young red cells present. In phenylhydrazine-treated birds the young red cells increased in number, resulting in fewer cells being infected by more than one parasite.

III. Attempts were made to immunize canaries against a virulent strain of *Plasmodium cathemerium* by the use of large quantities of serum derived from (a) uninfected birds, (b) birds with a latent infection and (c) birds with acute infections; administration of serum was followed a week later by injection of the parasites. Three birds were used in each group. Birds treated with serum from uninfected birds showed less resistance than untreated control birds, whilst those injected with serum from birds with latent infection suffered a severe reaction and two died. The group treated with serum from acute cases remained apparently unaffected, although showing a large number of parasites in the red blood cells.

IV. The identification of species of avian malaria parasites is based chiefly on their morphology as seen in the blood of the vertebrate host, and also on the characteristics of the infection in the canary. The classification is given in key and tabular form, and twelve species are differentiated, nine of which M. considers are valid species; there is much variability even within a given species and some stages of certain species resemble corresponding stages of others very closely. Also, there is evidence of the existence of races within a species which differ among themselves, *e.g.*, the various races of *Plasmodium praecox* differ in the length of their asexual cycle.

V. The term exo-erythrocytic schizogony refers to the schizogonic cycle of *P. gallinaceum* which occurs in cells, other than erythrocytes. It occurs also in other avian malarial infections. These schizonts grow much larger than intra-erythrocytic schizonts, and produce 50-60 or even more merozoites; they are non-pigmented, since they develop in haemoglobin-free cells such as circulating leucocytes, especially monocytes, and reticulo-endothelial cells in the brain, lung, liver, and spleen. When very numerous in the brain capillaries they occur in rows and may cause occlusion. They may be found in this site simultaneously with the presence of schizonts in erythrocytes in the peripheral circulation. In morphology they closely resemble similar stages of *Haemoproteus*. The possibility of a mixed infection with another parasite, *e.g.*, *Toxoplasma*, is considered but it is suggested that this theory does not fit in with the available evidence.—M. L. B.

I. MANWELL, R. D., & GOLDSTEIN, F. (1938). **Life History and Immunity Studies of the Avian Malaria Parasite,** *Plasmodium circumflexum.—Proc. Soc. exp. Biol., N.Y.* **39.** 426-428. [3 refs.]

II. ROUBAUD, E., COLAS-BELCOUR, J., & MATHIS, M. (1939). Transmission de *Plasmodium gallinaceum* par *Aëdes geniculatus.* [**Transmission of** *Pl. gallinaceum* **by** *Aedes geniculatus*].—*Bull. Soc. Path. exot.* **32.** 28-30. [3 refs.]

III. HENRY, C. (1939). Pouvoir infestant du sang au cours de l'incubation du paludisme de la poule (*P. gallinaceum*) inoculé par moustiques. [**Virulence of the Blood during the Incubation Period of** *Plasmodium gallinaceum* **Infection in Hens Infected by Mosquitoes**].—*Bull. Soc. Path. exot.* **32.** 30-35. 1 table. [4 refs.]

I. Six strains of *Pl. circumflexum* were used in the experiments. They were obtained from five different species of hosts and from widely separated localities. The results showed that a chronic infection with one strain protected against subsequent infection with another strain, although the degree of immunity to infection with another strain was less than after super-infection with the same strain. Passive immunity was conferred by repeated injections of serum obtained from chronic cases; the immunity was, however, greater in those birds which received parasites of the strain originally used to infect the donors of the serum, than in those infected with other strains. Regarding life-history, the occurrence of exo-erythrocytic stages of the parasite was confirmed.

II. Eight female *Aedes* were fed on a hen known to be infected with *Pl. gallinaceum.* After 11 days sporozoites were present in the salivary glands of two of the mosquitoes. A healthy cock was exposed to survivors of this batch and its blood was examined daily, but parasites were not found in the blood until 17 days later. *Aedes aegypti,* known vectors of the disease, were used as controls, and the incubation period was much shorter than with *Aedes geniculatus.*

III. H. investigated the virulence of hens' blood during the incubation period of *Pl. gallinaceum* infection. Two chickens were exposed to infected *Stegomyia albopicta* overnight and from them 10 c.c. of blood were taken and injected intravenously at different periods into healthy hens. Successful results were obtained only in the hens inoculated after the fifth day of the experiment.

Difficulty was experienced in obtaining a pure layer of leucocytes by centrifugation of the blood, and an attempt to ascertain whether leucocytes were infective was not successful.—A. L. WILSON.

MALBRANT, R., & RAPIN, L. (1939). Sur les piroplasmoses bovines du Tchad. Existence de *Babesiella berbera.* [**The Existence of** *B. berbera* **in Cattle in the Chad Area**].—*Bull. Soc. Path. exot.* **32.** 485-487.

The importance of piroplasmosis in the Chad region is discussed, and it is pointed out that most animals contract infection in youth and become immune carriers, but that relapses may be produced by rinderpest and other conditions. In examining 11 animals infected with rinderpest, *B. bigemina* was detected in seven animals, and in one case *B. berbera* was also present.—U. F. RICHARDSON.

WOLF, A., COWEN, D., & PAIGE, Beryl. (1939). **Human Toxoplasmosis: Occurrence in Infants as an Encephalomyelitis. Verification by Transmission to Animals.**—*Science.* **89.** 226-227. [6 refs.]

A protozoon, morphologically resembling *Toxoplasma,* was found associated with a widespread encephalomyelitis with focal necrosis, at the autopsy of a child 31 days of age, which had died after illness characterized by convulsive seizures and disturbance of respiration. The parasite was transmitted by intracerebral

inoculation to mice and rabbits, producing a fatal encephalomyelitis in those animals. Reference is made to four other cases of infection in infants, reported from New York, Chicago, Prague and Rio de Janeiro. The organism has been named provisionally *Toxoplasma hominis*, but it is pointed out that it is probably identical with the toxoplasms of other animals, and not a species specific to man.
—U. F. RICHARDSON.

SABIN, A. B. (1938). **Identification of the Filtrable, Transmissible Neurolytic Agent Isolated from Toxoplasma-Infected Tissue as a New Pleuropneumonia-Like Microbe.**—*Science.* **88.** 575-576. [6 refs.]

S. previously reported [*V. B.* **9.** 156.] the isolation from toxoplasma-infected tissue of a filtrable transmissible agent capable of producing a characteristic nervous disease in mice. This neurolytic agent has been grown in a cell-free medium, consisting of ordinary nutrient broth, 10% Seitz-filtered sterile bovine serum, and 0·5 glucose. Cultures were obtained from each of six infected brains, of which some had been kept in the dried state for months, while others were fresh. Sub-culture of the serum glucose broth cultures on serum agar gave colonies 20-100 μ in size similar to those described by LEDINGHAM [*V. B.* **4.** 725.] for the causal organisms of contagious bovine pleuro-pneumonia and agalactia.

Eighteen sub-cultures were made and the cultures were as pathogenic to mice as material from infected animals. The agent is filtrable, and its pathogenicity is inactivated at a temperature of 45°C. for 15 minutes. The culture and animal passage material gave complete immunity to each other. Filtration of cultures through Seitz filters yielded a material of which 0·5 c.c., on intravenous injection, but not on intracerebral or intraperitoneal injection, reproduced the typical nervous signs within 1-2 hours in three-week-old mice. Most of these mice died, but the survivors continued to show the same nervous signs and exhibited the same acute necrotic lesion in the posterior pole of the cerebellum, with the acidophilic necrosis of Purkinje cells so often observed in virus diseases. Neither the brain nor the viscera of these mice contained a transmissible agent.

S. reports that a toxin is produced early during growth, is present in very small amounts, and disappears from the cultures within two days of its appearance. It is thermolabile, being inactivated at 50°C. for 30 minutes. It is apparently antigenic, and the same as that produced *in vivo* during infection, since recovered mice are immune to it.

The organism was isolated in pure culture from the brain of a one-month-old healthy mouse and found to be non-pathogenic for mice; cultures contained no toxin. S. therefore concludes that this organism grows in symbiosis with toxoplasma, and that it has been made pathogenic for mice by repeated mouse passage.

HENRY, C. (1939). Présence dans les hématies de poulets d'éléments rappelant les corps de Balfour. [**Elements Resembling Balfour Bodies in Blood Cells of Fowls**].—*Bull. Soc. Path. exot.* **32.** 145-149. 1 fig. [10 refs.]

This is a description of cell inclusions found within the cytoplasm of the erythrocytes of fowls which were used for experiments with *Plasmodium gallinaceum.* In smears stained with May-Grünwald-Giemsa the inclusions appeared as red granular bodies, 0·5-2·5μ in diameter, surrounded by a halo and apparently showing evidence of binary and multiple fission. They were found in both diseased and healthy fowls.

The morphology of the bodies suggests their relationship to *Aegyptianella pullorum* (Balfour bodies) or to the parasite described by COLES in 1937 in New York and Philadelphia States [*V. B.* **9.** 236]. Further work on these inclusions is in progress.—E. G. WHITE.

DONATIEN, A., & LESTOQUARD, F. (1939). Sur l'épidémiologie de la conjonctivite granuleuse des ruminants (*Rick. conjonctivae*). [**Epidemiology of Granular Conjunctivitis in Ruminants Due to** *R.c.* **Infection**].—*Bull. Soc. Path. exot.* **32.** 304-310. [1 ref.]

Examination of lambs from birth showed that initial bodies of *R.c.* might be detectable on the conjunctival mucosa within 24 hours, and in all infected lambs appeared within three days. The initial bodies later developed to elementary bodies which invaded the epithelial cells and caused conjunctivitis. Animals which had recovered from infection showed granulations on the conjunctiva and membrana nictitans. It was shown that infection of the nasal mucous membrane might occur and thus the nasal discharge may be infective.

Infection in lambs isolated with their mothers was less severe than that of flock lambs. Infection was shown to persist for 63 days, but it is considered that it probably survives much longer and that parturition precipitates a relapse which acts as the source of infection for the lamb. Apparently recovered animals when reinoculated might suffer a second severe clinical reaction or might fail to react. If reinoculation is repeated the reactions become progressively milder.—U. F. R.

GIROUD, P., & PANTHIER, R. (1939). Aspect de phagocytose bactérienne pouvant simuler des rickettsies au niveau des conjonctives. [**Bacterial Phagocytosis on the Conjunctiva May Simulate Rickettsia**].—*Bull. Soc. Path. exot.* **32.** 464-466. 4 figs. on 2 plates.

The conjunctivae of cattle in three areas in which epidemic conjunctivitis did not exist were examined, and inclusion bodies resembling rickettsia were detected in the conjunctival epithelium. It is concluded that these inclusions were bacteria which had been phagocytosed by the conjunctival cells. The inclusions differed from rickettsia in that they did not exhibit the same selective staining affinities, and in that their contour was often badly defined. The size varied between $0{\cdot}2\mu$ and $0{\cdot}5\mu$, and they might be very numerous or only scantily present in the protoplasm of the cells.—U. F. RICHARDSON.

WALCH-SORDRAGER, B., & SCHÜFFNER, W. (1938). Die Selbständigkeit der L. canicola. [**The Autonomy of** *Leptospira canicola*].—*Zbl. Bakt. I.* (*Orig.*). **141.** 97-109. 10 tables. [18 refs.]

L.c. can be distinguished from other leptospira by serological tests, the clinical syndrome, experimental infection and the epidemiological character of the disease. Agglutination and lysis tests are those used. The infection in dogs is characterized by the prevalence of fatal nephritis. Icterus is infrequent and slight. Mild forms are also observed in which there are no clinical symptoms, although leptospira are present in the urine and may persist for some months. *L.c.* infection is about one-third more frequent in dogs than *L. icterohemorrhagiae* infection. The latter is characterized by a severe icterus. In 13 cases of *L.c.* infection in man there was no icterus and all recovered, whilst in two thirds of the human cases of *L.i.* infection there was icterus, and one fifth of the cases were fatal. *L.c.* infection of rabbits is a subacute or even chronic disease, whilst infection with *L.i.* soon leads to death. Rats are more resistant to *L.c.* than to *L.i.*, the former organism never being present in the urine, whereas the latter always is. Rats are known universally as carriers of *L.i.*, but a rat infected with *L.c.* has never been found, this organism occurring only in dogs and, exceptionally, in man.

—V. CHLÁDEK (PRAGUE).

WELCKER, A. (1938). Die Labatoriumsinfektionen mit Weilscher Krankheit. [**Laboratory Infections with Leptospira**].—*Zbl. Bakt. I. (Orig.).* **141.** 400-410. [Numerous refs.]

The paper explains the need for the German regulation of 1936 enforcing the use of goggles and rubber gloves in laboratory work in connexion with leptospirosis in rats and dogs. Laboratory infections with Weil's disease are frequently traceable to apparently healthy animals, and sometimes occur in laboratories not concerned with work on leptospira. Only a portion of the accidentally acquired infections have been reported in the literature.

Leptospira are able to penetrate the intact skin. About 40-50 % of apparently healthy wild rats are vectors of spirochaetes, so that direct contact with rat urine is dangerous ; 21 % of 48 dogs with various diseases tested gave positive serological reactions for leptospirosis, and many dogs are probably continuous excretors of spirochaetes. Leptospira occur occasionally in cats. Diagnosis by the experimental infection of rabbits is uncertain, as older rabbits have some resistance to the infection.—V. CHLÁDEK (PRAGUE).

DISEASES CAUSED BY VIRUSES

GERLACH, F. (1938). Ueber Versuche zur Sichtbarmachung und Züchtung spezifischer Mikroorganismen bei Virus-Infektionskrankheiten und bösartigen Geschwulsten. [**Microscopy and Cultivation of Specific Micro-Organisms in Virus Diseases and Malignant Neoplasms**].—*Wein. tierärztl. Mschr.* **25.** 165-188. 20 text figs., 4 figs. on 1 plate.

Two methods of staining virus bodies were used (1) victoria blue as a direct stain, (2) primulin in conjunction with ultraviolet light (fluorescent staining). Such bodies were demonstrated in the viruses of the various poxes, ectromelia, rabies, Aujeszkey's disease, dog distemper, foot and mouth disease, poliomyelitis and influenza.

In addition bodies could be seen in bacteria-free filtrates prepared from malignant neoplasms, and in filtrates of isotonic solution suspensions of squashed tumours. These filtrates, when sown on various suitable media and incubated for 3-6 days, gave minute colonies visible under a hand lens. Suspensions of these colonies gave similar bodies but they failed to cause malignant disease when injected into hosts susceptible to the original tumour, and G. considers that a " disposition factor " is necessary before the neoplasms can develop.—P. S. WATTS.

LANFRANCHI, A. (1938). Esame di revisione di alcuni capitoli della febbre aftosa. [**Notes on Foot and Mouth Disease**].—*Nuova Vet.* **16.** 331-342. [2 refs.]

L. notes that the disease is apt to occur in cycles, a period of virulent mortality and wide-spread infection being followed by a number of years during which cases are few and mortality low. He describes the bacilli encountered in the lesions, and the extent to which their action is of importance in F. & M. disease. He discusses at length the methods of immunizing animals against the disease. He has noted cases in which cattle vaccinated against anthrax have failed to contract foot and mouth disease when exposed to severe infection. This he ascribes to non-specific acquired immunity.—S. J. HODGMAN.

KAMMEL, O. (1938). Futterungsfragen bei der Maul- und Klauenseuche. Bemerkenswerte Beobachtungen eines schlesischen Veterinärrates. [**Dietetics of Cattle with Foot and Mouth Disease**].—*Tierärztl. Mitt.* **19.** 521-522.

K. gives a clinical account of F. & M. disease, describing the common complications and giving advice on the treatment of the various forms of the disease and on diet for affected animals.—A. T. PHILIPSON.

HONEKER. (1938). Das klinische Bild bei Maul- und Klauenseuche der Ziegen. [**Foot and Mouth Disease in Goats**].—*Berl. tierärztl. Wschr.* Jan. 14th. 17-20. [Numerous refs.]

An account of F. & M. disease in goats, with reference to naturally-contracted and artificial infection [see also REPPIN. (1929). *Arch. wiss. prakt. Tierheilk.* **60.** 166].

SALLINGER. (1939). Maul- und Klauenseuche beim Rehwild. [**Foot and Mouth Disease in Roe Deer**].—*Berl. Münch. tierärztl. Wschr.* Feb. 10th. 89. 1 fig.

A record of F. & M. disease diagnosed clinically in two roe deer.

—V. CHLÁDEK (PRAGUE).

WOLF, J. (1939). Die Empfänglichkeit des Igels für die Maul- und Klauenseuche. [**Susceptibility of the Hedgehog to Foot and Mouth Disease**].—*Berl. Münch. tierärztl. Wschr.* Jan. 6th. 4-6. 2 tables. [4 refs.]

Of five hedgehogs inoculated with type A virus direct from an outbreak through scarifications in their soles, two became infected. In further experiments marked lesions developed in four hedgehogs similarly inoculated with virus passaged through g. pigs, and also in hedgehogs which were housed together with those inoculated. No infection resulted, however, when hedgehogs were kept for a considerable time in contact with material contaminated with the saliva of diseased cattle, or were fed milk to which vesicle material from the tongues of diseased cattle was added. W. concludes that although the hedgehog may occasionally be infected by inoculation, in its natural life it is not likely to be an important factor in the distribution of F. & M. disease, as was suggested by HULSE and EDWARDS [*V. B.* **9.** 16].

I. MOLDENHAUER, W. (1938). Die Gewinnung von Rekonvaleszentenserum gegen Maul- und Klauenseuche in der warmen Jahreszeit. [**Production of the Convalescent Serum Against F. & M. Disease during the Warm Season**].—*Tierärztl. Rdsch.* **44.** 501-503. 2 figs.

II. RÖHRER, H. (1938). Erfahrungen bei der Herstellung von MKS-Rekonvaleszentenserum. [**Preparation of F. & M. Disease Convalescent Serum**]. —*Berl. tierärztl. Wschr.* June 24th. 365-367.

I. Crude emergency field methods of preserving blood for a limited time are described. Defibrinated blood is placed in cans and an ice-salt freezing mixture is used to maintain the low temperature.

II. B. describes the preparation of serum from convalescent animals. There is no new information.—HANS GRAF (ZÜRICH).

I. JOST, J. (1938). Ist Maul- und Klauenseuche auf den Menschen übertragbar und wie kann man sich eventuell davor schützen? [**The Prevention of Foot and Mouth Disease in Man**].—*Z. ärztl. Fortbildg.* **35.** 79-80.

II. WAGENER, K. (1938). Die Maul- und Klauenseuche als medizinisches Problem. [**Foot and Mouth Diseases as a Medical Problem**].—*Med. Klinik.* **34.** 173-175. 2 figs. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **129.** 199].

III. ROCHAIX, A., & DELBOS, J. (1938). Sur la contagiosité de la fièvre aphteuse de l'animal à l'homme. [**The Infectivity of Foot and Mouth Disease for Man**].—*Rev. Hyg. Méd. prév.* **60.** 321-330. [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 975. Signed: R. L.].

I. A brief account of the disease in man, including the nature of the syndrome and the methods of infection.

II. A general account of F. & M. disease in cattle, with a description of the syndrome in man.

G. pigs should be inoculated for diagnosis. Human beings are not carriers and excretors of the virus, although they are, after the susceptible animals, the commonest means of mechanically spreading the disease.

III. Two cases of disease are reported following the partaking of unboiled milk or milk products, and the epidemiological and clinical evidence suggest them to be cases of foot and mouth disease in the human subject. A general discussion follows this brief record on whether this disease is transmissible to man, and the conclusion is drawn that there is not sufficient evidence to prove its transmissibility or non-transmissibility. It is suggested that human beings are slightly susceptible, but that the disease can only develop under certain circumstances. A further suggestion is that children may suffer from a gastro-enteritis after consuming milk from cows with this disease, and therefore in their interests the milk from such sources should be boiled or pasteurized. [This problem hardly arises in this country where foot and mouth disease is so rigorously controlled].

I. PERAGALLO, I. (1937). Studi sul virus aftoso. [**Foot and Mouth Disease Virus Passaged on Fowl Embryos**].—*G. Batt. Immun.* **19.** 30-32. 2 figs. [English, French, and German summaries].

II. NEGRI, R. (1937). Sulla cultura del virus dell'afta epizootica. [**Culture of F. & M. Disease Virus**].—*Profilassi.* **10.** 225-227.

I. P. states that F. & M. disease virus can be cultured on the chorio-allantoic membrane of fowl embryos on the 14th day of incubation; 36-48 hours later characteristic vesicles are formed, radiating from the inoculation point over the whole surface of the membrane. Usually these vesicles are smaller and more numerous than those of vaccinia obtained by the same method.

II. N. briefly reviews the methods suggested by various authors for the culture *in vitro* of the F. & M. disease virus. In his opinion the problem of control of F. & M. disease is most likely to be solved by the active immunization of the susceptible animals with the help of a sufficiently active virus available in sufficient quantities.

RECEVEUR, M. (1938). Notes sur certaines affections du cheptel des régions nord-est du Tchad. La peste bovine expérimentale. [**Notes on some Affections of Livestock in the North-East of the Chad District. Experimental Rinderpest**].—*Rec. Méd. vét. exot.* **11.** 159-166. [1 ref.]

This is a description of rinderpest affecting the bovines of a country where the disease is endemic, and in particular of 2,500 of these cattle which were artificially infected for the production of anti-rinderpest serum. The disease apparently differs in no important detail from that in other countries where it is endemic. There is however one unusual symptom described, namely, a very marked atrophy of the muscles of the croup and thigh from which recovery is very slow.—G. W.

I. LYON, B. M. (1939). **Present Status of Equine Encephalomyelitis and Its Control.**—*Cornell Vet.* **29.** 198-216. 6 tables.

II. Farquharson, J. (1939). **Infectious Equine Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **94.** 459-465. 3 figs. [2 refs.]

III. Randall, R. (1939). **Notes on the New England Outbreak of Equine Encephalomyelitis.**—*Vet. Bull. U.S. Army.* **33.** 87-95. 2 tables. [11 refs.]

IV. Anon. (1939). **Equine Encephalomyelitis—1938.**—*Ibid.* 130-132. 1 table, 1 map. [1 ref.]

V. Osteen, O. W. (1939). **Infectious Equine Encephalomyelitis: Mid-Winter Case.**—*J. Amer. vet. med. Ass.* **94.** 441-442.

I. During 1938 equine encephalomyelitis extended its sphere to the greater part of the U.S.A., but the eastern and western viruses remained confined to their respective territories east and west of the Appalachian mountains. Many species besides equines were recognized as hosts, including man, and a number of fatal cases in human beings occurred. The mode of transmission has been established, mosquitoes, ticks, and other blood-sucking insects being incriminated as vectors. Ticks are considered to be the most likely inter-seasonal virus hosts.

Laboratory diagnosis is not yet entirely satisfactory. Frequent instances occur in which virus cannot be recovered from brain tissue even in the most typical clinical cases.

Immunization of the susceptible host remains the most fruitful method for the control of the disease. Active immunization with chick-embryo vaccine gives outstandingly successful results, and a new concentrated antiserum is expected to render passive immunization more effective than hitherto.

II. Clinically the disease usually assumes the form of a lethargic encephalitis, although its early stages may be manifested by hyperaesthesia. Young animals generally tend to respond better to treatment than older subjects. In acute cases complete paraplegia occurs in a few hours, and death soon follows. Horses which recover sometimes develop mental peculiarities, such as a dislike to entering stables or passing through gates; this condition is known as "post-encephalitis disease". In treatment of well-established cases, rest, quiet, and measures to overcome dehydration afford better chances of success than serum dosage. Chick-embryo vaccine procures rapid immunity, and is therefore effective, not only before, but during an epizootic.

III. It is estimated that 326 cases of equine encephalomyelitis occurred in Massachusetts during 1938. Of the other New England states 40 cases were recorded in Connecticut, 30 in Rhode Island, 2 in Maine, and 6 in Vermont. The U.S. Army had 40 horses on pasture at Canton, Mass. which is in the epizootic area. During August one of these animals showed symptoms of colic, and after three or four hours became prostrate. It became very violent and its temperature rose to over 108°F. Symptomatic treatment was given, but death occurred about 11 hours after the initial symptoms appeared. The remaining horses seemed normal and were vaccinated next day with chick-embryo vaccine. Two days later another horse became ill, and showed typical symptoms of encephalomyelitis. Examination of the brain immediately after destruction of the animal revealed the presence of virus. Two other animals showed symptoms of the subclinical type of the disease, but no more severe cases occurred. In all 323 army horses in Massachusetts were vaccinated during the outbreak, with only the two losses above.

IV. In 1938, 184,662 cases of the disease were reported in U.S.A. The incidence was 23·6 cases per 1,000 horses in the 39 states involved, and the mortality was 21·4%. In Eastern states the incidence was 39 cases per 1,000 animals with a mortality of 90·2%, while the figures for Western states were 24·8 per 1,000 and 19·8% respectively.

39 cases with 15 deaths were reported from the army with an incidence of

5·4 cases per 1,000 animals on infected stations. The incidence among all army animals in U.S.A. was 1·9 per 1,000. The incidence of the disease was kept as low as possible by restriction of movement of animals into mosquito-infested epizootic areas. Early in the spring of 1939 all army horses were vaccinated with the chick-embryo vaccine.

V. In the U.S.A. cases of equine encephalomyelitis usually occur only during the months of July, August and September. A typical case of the disease was recorded, however, from Ocala, Marion County, Florida in January, 1939, from which the eastern type of the virus was isolated. The horse had not been vaccinated previously. The week prior to illness had been exceptionally warm, temperatures eight or nine degrees above the normal being recorded. Mosquitoes were active at the time.—D. D. Ogilvie.

Van Roekel, H., & Clarke, Miriam K. (1939). **Equine Encephalomyelitis Virus (Eastern Type) Isolated from Ring-Necked Pheasant.**—*J. Amer. vet. med. Ass.* **94.** 466-468. [5 refs.]

Two ring-necked pheasants from a New Jersey flock which had previously suffered heavy losses were found to be infected with the eastern type of equine encephalomyelitis virus. Diagnosis was effected by cross-immunity tests with g. pigs, and neutralization tests with equine hyperimmune serum. A number of other susceptible hosts in nature were also detected, including the English sparrow, and the mouse.—D. D. Ogilvie.

I. von Mócsy, J. (1938). Untersuchungen über die Natur des Anämievirus der Einhufer. [**The Nature of the Virus of Equine Infectious Anaemia**]. —*Arch. wiss. prakt. Tierheilk.* **73.** 25-31.

II. Wittfogel, H. (1938). Der Wert des Meerschweininfektionsversuches für die Erkennung der ansteckenden Blutarmut der Einhufer. [**The Use of the G. Pig Infection Test for the Diagnosis of Equine Infectious Anaemia**]. —*Z. InfektKr. Haustiere.* **53.** 148-157. [19 refs.]

I. Trials to find the blood fraction associated with the virus revealed the infectivity of the blood globulin and blood albumin, the dialysate being non-infective. The virus appears either to be attached to these blood proteins or is itself of protein nature. The author believes, although he gives no evidence, that the virus is apparently lifeless, and that its augmentation is due to abnormal metabolism of the infected animal. Large doses of X-rays, lethal to living cells, produce no harmful effect upon the virus. The author is continuing his investigations.

II. Experiments on 84 g. pigs, some injected with the virus of equine infectious anaemia, and some inoculated with normal horse blood, to eliminate the possibility of a non-specific albumin reaction, revealed that the g. pig inoculation test has no value whatever for the diagnosis of the disease. Clinical, haematological, pathological and histological examinations showed no specific changes in the g. pigs referable to the virus.—V. Chládek (Prague).

Waldmann, O., & Köbe, K. (1937). Kritische Bemerkungen zu den Versuchen über die Aetiologie der Grippe bei Mensch und Tier. [**Aetiology of Influenza in Man and Animals**].—*Zbl. Bakt. I.* (*Orig.*). **138.** 153-158. [9 refs.]

The authors review their own work and that of Shope in a comparative manner, and conclude that pneumotropic viruses are the cause of influenza-like conditions in pigs (swine and piglet influenza) and in cattle and horses (infectious

bronchitis). In each case the infection can be induced by intranasal instillations of bacteria-free filtrate, whilst in each case secondary bacterial infection may complicate the condition and render it more severe. In pigs the secondary invader is *Haemophilus influenzae suis*, in horses haemolytic streptococci and in cattle non-haemolytic streptococci or *Pasteurella septica*. The similarities between these conditions and human influenza are discussed.—E. J. PULLINGER.

LAMONT, H. G., & KERR, W. R. (1939). **Infectious Pneumonia of Calves or Calf Influenzal Pneumonia.** [? *Haemophilus influenzae*].—*Vet. Rec.* **51.** 672-674.
GILMORE, H. D. (1939). **Infectious Calf Pneumonia or Calf Influenzal Pneumonia.** —*Ibid.* 674.

I. A preliminary account of transmission experiments to determine the aetiology of a type of calf pneumonia which is stated to be widespread in Northern Ireland. At least three different organisms have been isolated from the lungs, *viz*, a bipolar organism, *Corynebacterium pyogenes*, and an organism which corresponds to *Haemophilus influenzae* of piglet influenza. The experiments recorded in this paper, however, indicate that the exciting cause is a filtrable virus. The disease could be transmitted by direct contact between healthy and affected calves, and by muslin filtrates of ground-up pneumonic lungs ; 15 c.c. of a muslin filtrate passed through a Berkefeld or a Seitz filter and then injected intranasally into healthy calves produced typical pneumonia. Treatment of affected calves in natural outbreaks with M & B 693 is stated to have given excellent results.

II. A clinical description of the outbreak described in I.—N. J. SCORGIE.

I. PERAGALLO, I. (1937). Coltura del virus rabbico nella membrana corion-allantoidea dell'embrione di pollo. [**Cultivation of Rabies Virus on the Chorio-Allantoic Membrane of the Egg Embryo**].—*Ann. Igiene* (*sper.*). **46.** 421-425. 5 figs. on 2 plates.
II. KLIGLER, I. J., & BERNKOPF, H. (1938). **Cultivation of Rabies Virus in the Allantois of the Developing Chick Embryo.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 212-214. [1 ref.]

I. P. inoculated the chorio-allantoic membrane of 15-day incubated eggs with rabbit-brain rabies virus, and obtained growth of the virus as judged by the ability to carry it over 18 passages, by periodic rabbit inoculation tests and by the demonstration of Negri bodies in the egg embryo tissue. The Negri bodies are illustrated in colour and a comparison is made of these and of Guarnieri bodies.

II. The authors collected virus 2 hours to 14 days after inoculation from 10 out of 22 eggs, and only secured two sub-cultures. They were unable to obtain any definite multiplication of virus. Particulars of technique are given.—J. E.

MILAM, D. F. (1939). **The Effect of Various Diluents Acting for Short Periods on Rabies Virus in High Dilutions.**—*Amer. J. trop. Med.* **19.** 297-301. 3 tables. [6 refs.]

Fresh rabies passage virus was diluted in tenfold serial dilutions up to 10^{-7} with distilled water, normal saline, " serum water ", " serum saline ", " serum-Tyrode solution ", serum broth, or by hormone broth, the suspension being allowed to stand for intervals up to 24 hours, and then being injected into mice intracerebrally.

" Serum-Tyrode solution " had the least harmful effect on the virus, and hormone broth was the most injurious.—J. E.

I. NOURY, M. (1937). Rapport sur le fonctionnement du service antirabique, du 1er Janvier au 31 Décembre, 1936. [**Report on the Rabies Service, Morocco, in 1936**].—*Arch. Inst. Pasteur Maroc.* **1.** 921-926.

II. NOURY, M. (1937). Rapport sur le fonctionnement du service antirabique du 1er Janvier au 31 Décembre, 1937. [**Report of the Rabies Service, Morocco, in 1937**].—*Ibid.* 927-931.

I. 1,217 persons were treated with anti-rabic vaccine. The method used is that of the Pasteur Institute of Paris ; cords dried at 23°C. are stored in neutral glycerin at 4°C. Daily inoculations of 3 c.c. are given, the treatments ranging from 15-25 days according to the indications in each case and with cord dried from two to five days. 444 Europeans and 773 natives received treatment. Analyses are given of the species of biting animals incriminated, characters and sites of the wounds, and districts in which persons were bitten. 12 deaths occurred ; 4 of these took place during treatment and 4 within 12 days following treatment, before the full effect of the vaccine had been produced. The figures show an increase of rabies compared with previous years.

II. 297 Europeans received treatment and 583 natives. Six deaths were recorded, of which 4 occurred during treatment and one in less than 15 days from completion of treatment. Analyses of species of biting animals, sites and types of wounds etc. are also given.—S. J. GILBERT.

KLIGLER, I. J., & BERNKOPF, H. (1938). **Studies on Antirabic Immunization with Formolised Culture Virus.**—*Brit. J. exp. Path.* **19.** 378-383. 3 tables. [6 refs.]

The vaccine material consisted of tissue culture incubated for four or five days, centrifuged and the sediment triturated and suspended in the supernatant fluid. 0·1% formalin was then added. The experiments were performed on mice and were designed to ascertain the immunizing effect of (1) varying doses and number of injections of formolized cultures, (2) formolized cultures followed by intraperitoneal or subcutaneous infection with active brain virus, and (3) live culture virus. The formolized cultures showed considerable immunizing capacity for mice if injected intraperitoneally. The immunity was incomplete against intracerebral injection of test virus but was more easily established against intraperitoneal or subcutaneous infection. Immunized mice which survived intraperitoneal infection were more immune than surviving untreated test mice. Only half the mice which survived an intraperitoneal infection without previous vaccination were immunized to an intracerebral infection, whereas 84% of previously immunized mice proved immune. Intraperitoneal infection with virus culture of low virulence gave a high degree of immunity against intracerebral infection with test brain virus.
—S. J. GILBERT.

BALOZET, L. (1938). Etat actuel de nos connaissances sur la rage dans les contrées tropicales et sub-tropicales et sa prophylaxie. La vaccination préventive des chiens. [**Present State of Knowledge and Prophylaxis of Rabies in Tropical and Sub-Tropical Countries. Preventive Vaccination of Dogs**].—*Arch. Inst. Pasteur Tunis.* **27.** 450-469. [1 ref.]

Rabies has a world-wide distribution with the exception of a few European countries and Australia, New Zealand and the Pacific Islands. It assumes more importance in tropical and sub-tropical countries where methods of suppression are insufficient or absent, or where perhaps there are difficulties in view of local conditions.

B. reviews the distribution, the transmitting agents (the wild animals that

maintain the infection), varieties of the disease or of virus, the preventive measures, and vaccination. In most countries dogs are chiefly concerned in the spread of rabies, but in South Africa certain felines and Viverridae are of importance, whilst jackals and hyenas are the principal animal vectors in many countries. The paralytic rabies of South America is transmitted by blood-lapping bats. Certain forms of rabies may be mistaken for Aujeszky's disease or Borna disease. Ouloufato, a disease of dogs in West Africa, has now been proved to be rabies. In the prevention of rabies, the destruction of dogs and cats which have been bitten by rabid animals, and control of the numbers of dogs and their registration and taxation are necessary measures. Some countries have added as an accessory measure preventive vaccination. Phenolized vaccine with or without glycerin, is most commonly used, but in any case killed vaccines are preferable. The choice of the fixed virus used for vaccine production is important and the technique employed should be adapted to the virus used. Post-vaccination paralysis appears to be more frequent with certain viruses.

In animals good results have not followed the use of vaccine after infection, and dogs which have been bitten by rabid or suspected rabid animals should be destroyed. Preventive vaccination of dogs before they are exposed to danger of infection is giving satisfactory results in some countries but should not replace the regulations to prevent the spread of the disease.—S. J. GILBERT.

OTT, G. L. (1939). **Treatment of Fox Distemper.**—*J. Amer. vet. med. Ass.* **94.** 522-525. 1 fig., 4 charts.

Treatment with anti-dog-distemper serum, prepared in dogs, was effective in reducing the losses resulting from distemper in a large silver fox ranch. Before treatment was begun, there had been an average annual mortality of 35-60% in animals " on the fur range " (*i.e.*, animals 8-10 months old) during the months of October, November and December. During 1938, 11,826 fox pups each received 10 c.c. of anti-canine distemper serum, whilst 7,523 were left as untreated controls. The mortality in the treated group was 10·5%, and in the untreated group 21·1%. The pups came from different breeding ranches, but all animals " on the fur range " were kept under identical conditions. It is stated that the use of serum was satisfactory as the animals were " pelted " about two months after entry to the " fur range ". [It is not clear why a single dose of serum alone gave protection].
—N. J. SCORGIE.

SYBESMA, R. P. (1937). Waarom is Nederland niet meer voldoende tegen pokken beschermd ? [**Pox in Holland**].—*Tijdschr. Diergeneesk.* **64.** 1230-1236.

S. adduces evidence from official data and from observations by doctors and veterinary practitioners indicating that since 1925 human and cow pox in Holland have gradually lost virulence ; at present, effective pox vaccine cannot be prepared from the existing cow-pox virus. For this reason he believes that obligatory vaccination with locally prepared vaccines would not protect the Dutch population from the introduction of pox from outside Holland.

CHADHA, S. R. (1939). **Sheep-Pox and its Control in the North-West Frontier Province.**—*Indian J. vet. Sci.* **9.** 81-85. 1 plate. [4 refs.]

A sensitized vaccine was tried ; fresh vesicle material from a natural case was mixed with serum from a recovered ram and kept for 3 days at 16-18°C., triturated, diluted and given subcutaneously. Seventy-seven animals were vaccinated. The vaccination gave rise to a local swelling and a febrile reaction at the fifth day ; temperatures returned to normal after two days, but the local reaction persisted for

some days. The vaccinated animals were subsequently exposed to natural infection and appeared immune.—H. E. Harbour.

I. Levaditi, C., Stamatin, L., Reinié, L., & Le-Van-Sen. (1939). Ultravirus et fluorescence. Nombre des corpuscles élémentaires vaccinaux et virulence nevraxique (neurovaccin et dermovaccin). [**Ultraviruses and Fluorescence. Relation between Number of Elementary Bodies and Neurotropism of Vaccinia Virus**].—*C. R. Soc. Biol. Paris.* **130.** 1091-1094. [4 refs.]

II. Levaditi, C., & Reinié, L. (1939). Ultravirus et fluorescence. Virulence cutaneé et nombre des éléments corpusculaires vaccinaux (neurovaccin), en fonction de l'origine de ces éléments. [**Ultraviruses and Fluorescence. Virulence for the Skin and Number of Vaccinia Elementary Bodies (Neurovaccine)**].—*Ibid.* 1094-1096. [1 ref.]

I. The relationship between the number of elementary vaccine bodies (N.b.) per unit volume and the minimum vaccinal dose (m.v.d.) has been noted to vary according to the strain of virus and the infective tissue used. This article summarizes experiments with neurovaccine and dermovaccine which substantiate this relationship. The authors conclude that the N.b. of neurovaccine in the m.v.d. varies according to whether intracranial or intradermal titration is used, the figure being about five times higher with the latter than with the former. The virulence of dermovaccine by intracerebral titration is almost nil (no encephalitis produced), although inoculated animals were later proved to be immune to neurovaccine. A qualitative factor undoubtedly plays a part in the relation N.b./m.v.d. They propose to demonstrate the transition of a dermovaccine into an encephalitogenic strain under the influence of certain natural selective factors.

II. It was found that the number of testicular elementary bodies necessary to produce dermal lesions was much less than the number of bodies from the other two tissue sources of the virus (skin and brain), particularly when compared with the dermal virus. The bodies from the testicular source almost equalled in virulence those obtainable from allantoic membranes. The reasons for these variations will be explained later.—C. V. Watkins.

Nakamura, J., & Imai, N. (1938). **On the Infection of Fowl-Pest Virus " Strain Chiba " in Mice.**—*J. Jap. Soc. vet. Sci.* **17.** 256-290 of pt. I. 15 tables. [17 refs.] [In Japanese : abst. from English summary pp. 114-117 of pt. 2].

The authors were able to infect mice with fowl plague virus by intracerebral and intranasal inoculation, the former method yielding a higher percentage of infections. The brain, lungs and other organs from these animals subsquently proved infective for fowls and for the developing egg. The virus was passed through 13 serial passages in mice with no loss of infectivity for fowls. Serial passage through mice caused an elevation in virulence of the virus for these animals ; the symptoms of the induced disease and the P.M. findings in mice are described.

The authors traced the path of a virulent mouse virus, and the organs in which it became progressively localized, by killing mice at varying periods of time after intravenous inoculation.—L. E. Hughes.

Anon. (1938). **Psittacosis Again.**—*Brit. med. J.* April 2nd. 737.

Sporadic cases of the disease continue to arise in Great Britain. Neither the human nor the bird population has been completely protected by regulations controlling the introduction of members of the parrot family. It is now known that the disease occurs in home-bred birds ; the importation regulations overlooked

the possibility of entry of carriers among birds which passed through the quarantine period.

The periodic examination of the stock of pet shops is recommended, and also the education of the public to the fact that canaries and finches are susceptible and should not be kept in close association with human beings. The need in the future, perhaps, of safeguarding the health of visitors to zoological gardens is pointed out.—L. E. HUGHES.

KIDD, J. G. (1938). **Immunological Reactions with a Virus causing Papillomas in Rabbits. I. Demonstration of a Complement Fixation Reaction: Relation of Virus-Neutralizing and Complement-Binding Antibodies. II. Properties of the Complement-Binding Antigen Present in Extracts of the Growths: Its Relation to the Virus. III. Antigenicity and Pathogenicity of Extracts of the Growths of Wild and Domestic Species: General Discussion.**—*J. exp. Med.* **68.** 703-724, 725-736 and 737-759. Numerous tables. [Numerous refs.]

I. Specific complement-fixation occurs with saline extracts of the virus-induced papillomas and the sera of rabbits bearing the growths. The sera of rabbits, which have borne large growths over long periods, fix complement in higher titre than the sera of others with small growths of shorter duration.

The sera of cottontail rabbits fixed complement and neutralized the virus in much higher titre than the sera of domestic rabbits with comparable growths. A further experiment showed that the production of complement-binding and virus-neutralizing properties of immune serum is stimulated by a specific antigen liberated from the virus-induced papillomas.

II. The complement-binding antigen was shown to be retained by filters in almost the same proportions as the virus. Heating at 56°C. and 60°C. had no noteworthy effect either on the virus or on the complement-binding antigen, whereas 63°C. and 69°C. rendered both inactive.

Ultraviolet rays could render papilloma extracts non-pathogenic without diminishing their capacity to bind complement. At pH levels of 1·8, 2·8 and 10·5 the pathogenicity and complement-binding capacity of the materials were abolished, while both remained unaltered at pH 4·4 and 9·0, as also at 6·6 and 6·8. At pH 9·8 the extracts had lost completely or almost completely their infectious properties, while retaining undiminished their capacity to bind complement.

III. Extracts which contained active virus in large amount bound complement very well, while those containing little or no virus fixed it poorly or not at all. Small, discrete, naturally occurring papillomas of cottontail rabbits usually furnished virus of high titre, while the larger confluent growths in highly susceptible cottontails yielded virus in moderate or small amounts or not at all. The sera of animals carrying large growths developed marked ability to neutralize the virus.

The papilloma virus gave rise to growths of exceptional vigour when inoculated into the skin of domestic rabbits, yet only rarely could it be recovered from them and then in an attenuated form. Crude suspensions of "non-infectious" papillomas from domestic and wild rabbits failed to bind complement under optimal conditions of test.—R. ISHERWOOD.

I. BURNET, F. M., & FREEMAN, M. (1939). **Note on a Series of Laboratory Infections with the Rickettsia of "Q" Fever.**—*Med. J. Aust.* Jan. 7th. 11-12. 2 tables.

II. SMITH, D. J. W., BROWN, H. E., & DERRICK, E. H. (1939). **A Further Series of Laboratory Infections with the Rickettsia of "Q" Fever.**—*Ibid.* 13-14.

III. DERRICK, E. H. (1939). **Rickettsia Burneti: The Cause of "Q" Fever.**—*Ibid.* 14.

I. A series of mild or sub-clinical laboratory infections of human beings with "Q" fever is described. Agglutinating and protective antibodies were demonstrated in the serum of those affected. The mite *Lyponyssus bacoti* is suspected of being the responsible vector, from experimentally infected mice. These cases occurred at Melbourne, where no natural cases of infection have been reported.

II. Two laboratory infections occurred among the staff of the Queensland Health Department at Brisbane. It is suggested that the infection probably resulted from direct contact with infected mouse tissues. The authors consider that work with g. pigs provides little risk of accidental infection. G. pig inoculation failed to reveal the infectivity of *Liponyssus bursa* the tropical fowl mite which was present on the laboratory mice. The lice *Gliricola porcelli* and *Gyropus ovalis* parasitic on infected g. pigs similarly failed to produce infection.

III. D., who first described "Q" fever and who has been active in subsequent research work, names the causal organism of this disease *Rickettsia burneti* after F. M. BURNET, the discoverer of the organism. A useful list of articles dealing with the clinical and bacteriological investigations up to the present time is given.—T. S. GREGORY.

PARASITES IN RELATION TO DISEASE (GENERAL)

I. HALL, M. C. (1939). **The Relation between Parasitic Diseases of Man and Animals.**—*Rep. 13th. int. vet. Congr. 1938.* **1.** 646-652. [In English: French, German and Italian summaries. Discussion pp. 664-665 in German].

II. KRAL, F. (1939). Die Beziehungen zwischen den parasitä en Krankheiten des Menschen und der Tiere. **[The Relation Between Parasitic Diseases of Man and Animals].**—*Ibid.* 653-664. [Numerous refs.] [In German: English, French and Italian summaries. Discussion pp. 664-665 in German].

I. H. discussed the relationship between parasitic diseases of man and animals generally. He made a plea for the recognition of the importance of this branch of epidemiology.

II. The paper includes a comprehensive list of helminths, protozoa, insecta and acari, and bacteria causing conditions common to man and animals. K. urges that the study of this subject should be further developed.—A. L. WILSON.

GAMBLES, R. M. (1939). **A List of Parasites Recorded from the Domestic and Wild Animals and Birds of Cyprus.**—*Cyprus (agric.) J.* **34.** 29-32.

G. has compiled a list of approximately 140 protozoan, helminth and ectoparasites found in Cyprus. Apart from the usual domestic animals, other hosts mentioned are the fox, hedgehog, snake, rat, hare, rabbit, camel, pigeon and marsh harrier.—A. L. WILSON.

ROBERTSON, D. (1939). **Intestinal Parasites of Shetland Ponies in the North of Scotland.**—*Vet. Rec.* **51.** 779-781. [4 refs.]

This paper is based on the results obtained at autopsy on four Shetland

ponies which had died as a result of infestation with intestinal parasites. Twenty-five species of nematodes and two species of cestodes were obtained and three of the ponies were infested with the larvae of *Gastrophilus intestinalis*. 325 specimens of *Anoplocephala perfoliata* were taken from one pony while another yielded 225 specimens. The other cestode was *Anoplocephala mamillana* of which 25 specimens were found. With the exception of *Trichostrongylus axei*, *Habronema microstoma*, *Ascaris equorum*, *Strongylus edentatus*, and *Strongylus vulgaris*, all the other parasites found belonged to the genera of the smaller strongyles. *Triodontophorus teniucollis*, in particular, was found in large numbers in the right colon of all the ponies examined. The ponies were very emaciated and the wall of the caecum was three quarters of an inch thick in places.—A. L. Wilson.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Stefański, W. (1935). La distribution de l'hypoderme du boeuf en Pologne. [**Distribution of** *Hypoderma bovis* **in Poland**].—*XIIe Congr. int. Zool. Lisbonne, 1935.* **3.** 2057-2060. [In French].

Results of enquiries into the distribution of ox warbles addressed to each veterinary surgeon in 225 districts, were as follows :– 10 % in 92 districts, 25 % in 50 districts, 40 % in 27 districts and 100 % in 30 districts. Of 3,341 larvae collected, 2·3 % were *Hypoderma lineata* and the remainder were *H. bovis*. The latter is apparently limited to the frontiers of Poland. The principle areas infested are the north-east, comprising seven districts, where *H. lineata* constitutes 18·4 % of all the larvae, and the south, comprising three districts, where the percentage of *H. lineata* is ten.

Zottner, G., & Coste, E. (1939). L'hypodermose équine au Maroc. [*Hypoderma bovis* **Infestation of Horses in Morocco**].—*Bull. Soc. Path. exot.* **32.** 571-576.

Observations were made in Morocco on infestation of horses with larvae of *Hypoderma bovis*, the parasites having appeared on the withers, loins and back. The treatment adopted was, not to open the lesions, but to wait until the grubs could be removed by pressure. Infestation occurred in the winter, from November to March. Stallions at stud were never found to be affected, and it is suggested that the careful grooming of such stallions removes the eggs from the hair. It is suggested that as, owing to the limited range of flight of the adults, invasion from the outside is on a very small scale, this really eliminates the *H.b.* flies on the stud and explains why young horses are not affected until the time of sale. The parasites obtained were in most cases second stage larvae, but two sent in were identified as third stage larvae; a full account of the characters of the larvae is given. In view of this evidence, it is suggested that these larvae can grow to maturity in the horse.—R. P. Hobson.

Doten, S. B., Fleming, C. E., & Vawter, L. R. (1938). **The Relation of Methods of Herding Sheep on the Open Range to the Prevalence of Grub in the Head (Oestrus ovis).**—*Rep. Nev. agric. Exp. Sta. 1936-37.* p. 33.

Information obtained from Nevada in 1936 tends to confirm the idea that methods of herding affect profoundly the prevalence of this insect in range flocks. During the summer, losses and injuries due to this insect were at a minimum. This appeared to be due mainly to the fact that good range conditions made it unnecessary to concentrate the sheep close to watering places. The flocks were

widely scattered over the grazing territory, and the adult flies were usually remote from the sheep when they hatched from the soil.—R. P. Hobson.

Knowlton, G. F., Harmston, F. C., & Hardy, D. E. (1938). **Blood-sucking Utah Diptera.**—*Proc. Utah Acad. Sci.* **15.** 103-105. [Copied *verbatim* from *Rev. appl. Ent.* **27.** 31].

Since mosquitoes have been found to be capable of transmitting equine encephalomyelitis from diseased to healthy animals under experimental conditions and since outbreaks of the disease have occurred in Utah in 1933-35 and 1937, it has been thought desirable to obtain information on the species and seasonal prevalence of blood-sucking insects. For this reason, a list is given of mosquitoes and other blood-sucking Diptera taken in all parts of the state during the last few years, showing the localities and dates of collection.

King, W. V., & Lenert, L. G. (1936). **Outbreaks of** *Stomoxys calcitrans* **L. ("Dog Flies") along Florida's Northwest Coast.**—*Florida Ent.* **19.** 33-39. 3 figs. [Abst. from abst. in *Rev. appl. Ent.* **25.** 132].

Swarms of *Stomoxys calcitrans* appear along 200 miles of the coast of north-western Florida, at the end of August or beginning of September. Investigations showed that the fly was breeding in piles of *Sargassum* seaweed at the edge of a salt-water lake. The removal of piles of seaweed as they accumulate may be an effective method of controlling the fly.

I. Remlinger, P., & Bailly, J. (1938). Contribution à l'étude expérimentale des accidents déterminés par la tique du chien (*Rhipicephalus sanguineus*). [**The Infectivity to the Dog Tick** *R. sanguineus* **of Material from Ticks Fed on Dogs Inoculated with Rabies Virus**].—*Ann. Parasit. hum. comp.* **17.** 1-3. [1 ref.]

II. Remlinger, P., & Bailly, J. (1939). Développement possible du virus rabique dans l'organisme de la tique du chien (*Rhipicephalus sanguineus*). [**Possible Development of Rabies Virus in the Dog Tick** *R. sanguineus*].—*Ann. Inst. Pasteur.* **62.** 463-467.

I. It was found that ticks were present on dogs that had been inoculated with rabies fixed virus. Rabbits and g. pigs were inoculated with tick suspension prepared by grinding up ticks taken from these dogs. Out of 130 animals inoculated with the tick material, paralysis resulted in one rabbit; autopsy revealed no definite lesions that could account for death, and subinoculations were made into a normal rabbit which remained healthy. One rabbit and seven g. pigs of the above series of 130 died, but did not show symptoms of rabies.

II. One dog was inoculated with fixed virus, and another with street virus. Blood from engorged ticks collected from them was inoculated into two rabbits in the former case, and into four g. pigs in the latter. One rabbit died 48 days later, completely paralysed; numerous passages were made in which the inoculated animals developed the rabies syndrome and Negri bodies were detected. One g. pig succumbed to furious rabies 195 days later.—M. L. Bingham.

Elpat'evskiĭ, V. S. (1938). **Observations on** *R. sanguineus* **in the Town of Baku.**—*Trud. Azerbaij. Fil. Akad. Nauk.* (Sekt. Zool.). **7.** 127-130. 1 graph. [In Russian: German summary]. [Copied *verbatim* from abst. in *Rev. appl. Ent.* **26.** 197].

Rhipicephalus sanguineus, Latr., is abundant in summer on dogs in the town of Baku (Azerbaijan), and has also been taken on horses, cattle, sheep and goats.

It was the only tick found on a dog kept in the town from 24th February till the beginning of November and examined almost daily. The ticks appeared in March and disappeared in October, but were found on the dog throughout the intervening period. They showed two peaks of abundance, in May, when almost all of them were adults, and in July, when most of them were nymphs. Apparently, the nymphs hibernate and thus there is one generation a year ; under room conditions those that dropped from the dog transformed into adults about the middle of January, but none did so in the autumn. In nature the last moult probably occurs in spring. No larvae were found either on the dog or in the field, and attempts to rear them from the eggs were unsuccessful. In nature, engorged females and nymphs occurred in the cracks in the stone steps leading to the house.

—. (1936). El problema de la garrapata. [**The Tick Problem in Northern Argentine**].—*Rev. Med. vet., B. Aires.* **18.** 617-621.

A proposed act prescribes zones of clearance, commencing with areas having natural boundaries, in which stock-owners would make returns of their farm stock and submit it to dipping at intervals of not less than 14 days during the season when the larvae are prevalent. Credits would be available to enable the larger ranches to erect their own dipping tanks.

A maximum sum of 4,500,000 dollars would be appropriated for the initial expense of permanent dipping stations [number not specified], 185 portable dipping tanks, 1,300,000 litres of free parasiticide, advertisement, and requisition of transport. Heavy penalties would be imposed for failure to comply with the proposed act.—J. Pasfield.

Guerrero, R. P. (1938). Necesidad de una intensa campaña garrapaticida. [**Tick Control in Ecuador**].—*Rev. Cam. Agric. seg. Zona., Ecuador.* No. 5. pp. 31-35. 4 figs.

A note for stock owners concerning infection of cattle by *Babesia bigemina*, *Anaplasma marginale* and particularly "*Babesiella sudamericana*", the vector of which in Ecuador is *Boophilus annulatus*. The author's drastic suggestion is the employment of dipping in standardized arsenical dips, to every farm animal at intervals of 12 days throughout the year.—J. Pasfield.

Martin, R. (1938). Sur l'epilepsie parasitaire du cobaye. [**Epilepsy in G. Pigs Caused by Parasitism with Mallophaga**].—*Bull. Soc. Path. exot.* **31.** 736-740. [16 refs.]

Three instances of outbreaks of epileptiform convulsions, involving in all 12 animals, are recorded among rearing stocks of g. pigs at Dire Daoua and Addis Ababa, Ethiopia. The affected g. pigs were in all cases heavily parasitized by the biting louse, *Gyropus gracilis*. In the less severely affected animals treatment of the infestation led to recovery.

Infested g. pigs inoculated intracerebrally with rabies virus also developed the convulsions. M. suggests that convulsions were a manifestation of the reflex epilepsy described by Brown-Sequard and were due to the large numbers of parasites on the skin.

M. remarks, however, that whereas convulsions due to ectoparasites can generally be attributed to the action of a toxic secretion, this cannot apply in the case of biting lice, which live on epithelial detritus, and do not pierce the skin.
—J. MacLeod.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

I. MATERNOWSKA, J. (1939). Der Versuch einer Analyse der Intrakutanreaktion (I.K.R.) bei Parasitenkrankheiten. [**The Intradermal Reaction in Parasitic Diseases**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 699-708. [In German: English, French and Italian summaries. Discussion pp. 717-719 in English, French and German].

II. SCHOENAERS, F. (1939). Les réactions immunologiques dans les helminthiases intestinales. [**Immunological Reactions in Intestinal Helminthiases**].—*Ibid.* 709-717. 3 tables. [In French: English, German and Italian summaries. Discussion pp. 717-719 in English, French and German].

I. Three forms of intradermal reaction are recognized, (1) an early reaction which appears within 15-30 minutes and disappears in 5-8 hours; (2) a late reaction which begins after 6-8 hours, and (3) a biphase reaction, the first phase of which reaches its maximum in 22-28 hours. The appearance of an early or late reaction is dependent on the species of parasite, and so parasites can be classified into two groups according to the character of the intradermal reactions they stimulate, the first containing the parasites which are strictly intestinal and with which the reaction is of the early type, and the second those which usually infest the tissues of the body, and which stimulate a delayed or biphase action. Thus generally speaking an early reaction is seen in ascariasis, trichocephalosis, enterobiosis, ankylostomiases, strongylosis and various cestode infestations. The type of the reaction is influenced by several factors, including the type of parasite, the time elapsing since the invasion by the parasite, and repetition of the reaction itself on the same patient. The reaction appears as a group manifestation in parasitic infestations that are strictly intestinal, while it is more specific in infestations where the parasites live in the tissues. In intestinal parasitism the reaction may occur after the parasites have disappeared from the body of the host.

II. S. carried out c.f. tests for specific antibodies in the serum of hens infested by *Ascaridia galli* and *Heterakis gallinae.* Reactions for either parasite were not well defined and not specific. Uninfested animals gave positive reactions. S. considers that his tests indicate that the two parasites are closely related immunologically.

He states that so far as richness of the serum in antibodies is concerned parasitic diseases can be graded in descending order as follows :– diseases of the blood and tissues, intestinal diseases in which the parasites migrate through the tissues, and diseases in which the parasites live on the intestinal mucosa or on the external skin.—A. L. WILSON.

EMMEL, M. W. (1939). **Sulfured Soil for Poultry Yards.**—*J. Amer. vet. med. Ass.* **94.** 409-410. [2 refs.]

Experiments have been conducted at the Florida Agricultural Experiment Station in connexion with poultry raising.

Commercial flowers of sulphur scattered over the soil at the rate of 800 lbs. per acre (1·9 lbs. of sulphur per 10 sq. ft.) has been found useful in the control of parasitic diseases in cases where birds have to be confined in the same yards continuously. The action of soil bacteria on sulphur may eventually produce sulphuric acid, and lead to an acid reaction of the soil.

Only one application a year is necessary. The increased acidity of soil treated with sulphur causes the disappearance of intermediate hosts of poultry tapeworms and roundworms.

AFRICA, C. M., & DE LEON, W. (1938). **Observations on the Mechanism of Phagocytosis of Various Helminth Ova.**—*Livro Jubilar Prof. L. Travassos.* pp. 1-9. 20 figs. on 5 plates. [10 refs.] Rio de Janeiro : Instituto Oswaldo Cruz. [In English].

Experiments were made with a view to finding a new and better method of studying phagocytosis of foreign objects in the tissues.

Fertilized unincubated eggs of *Ascaris lumbricoides* placed in the mesentery and omentum of monkeys can develop there as if they were in a culture medium. Twenty-six days after intraperitoneal inoculation many eggs were embryonated ; others were less developed. The presence of these eggs attracts numerous giant cells which cause a tissue reaction.

No embryonal development was observed in any *Fasciola gigantica* eggs found in experimentally produced nodules, and degeneration of the contents of all eggs which had escaped destruction was noted.

In the case of *Schistosoma japonicum* the giant cells attack the eggs by anchoring themselves to the periphery and surrounding them with cytoplasmic projections.

The authors had observed that giant cells do not appear to attack heterophyid eggs, so they inoculated washed eggs into the peritoneal cavity of a monkey. Tiny nodules were recovered from the omentum when the monkey was killed two weeks later, but not a single giant cell was found.

HERBER, E. C. (1938). **Schistosoma Dermatitis in Dogs.**—*J. Parasit.* **24.** 474-475. 1 fig.

An attempt was made to infect a 14-day-old mongrel with cercariae of *Schistosoma douthii.* The puppy's abdomen was wetted for 20 minutes with water containing cercariae ; a rash appeared in 45 minutes and disappeared four days afterwards. [No further observations on this dog are reported].

CAWSTON, F. G. (1938). **Favourite Sites of Schistosomes and a Consideration of their Destruction in Stock.**—*J. trop. Med. (Hyg.).* **41.** 293-294. [6 refs.]

Schistosomiasis in stock is often difficult to detect. Cattle do not suffer from haematuria like infected persons ; instead they harbour the parasites in the nasal cavities, though not showing marked symptoms.

The treatment of stock affected with schistosomiasis is difficult. Slaughtering affected cattle would probably be a better control measure than attempting any cure, which might be only partly successful.—D. D. OGILVIE.

STENGEL. (1938). Verbreitung und Bekämpfung der Rinderfinne. **[Incidence and Control of Bovine Cysticercosis].**—*Berl. Münch. tierärztl. Wschr.* Nov. 11th. 692-695.

In Germany the number of detected cases of cysticercosis rose from 6,823 in 1925 to 18,532 in 1935. The figures include swine cysticercosis, but since the number of cases of the latter was only 1% of the total they may be regarded as of minor importance. It is estimated that *Taenia saginata* causes a total annual loss of two million gold marks, and it is suggested that the increase of cases may be due to an increased use of meat and " delikatessen " prepared from uncooked meat. As a means of controlling bovine cysticercosis a bonus of five marks is recommended to the lay meat inspector for every infested carcass he detects. At the present moment experiments are proceeding with a view to killing the cysts by means of electricity.—A. L. WILSON.

HARWOOD, P. D. (1938). **Reproductive Cycles of Raillietina cesticillus of the Fowl.**—*Livro Jubilar Prof. L. Travassos.* pp. 213-220. [11 refs.] Rio de Janeiro : Instituto Oswaldo Cruz. [In English].

H. carried out experiments on the rate of shedding of strobilae by tapeworms. *R. cesticillus* was fed to laboratory-raised chickens, in one of which infestation was observed for over 18 months. At the beginning of a cycle the segments were large and numerous, and well filled with eggs ; the segments gradually became smaller, contained fewer eggs, and a few sterile segments were excreted. The decline in segment elimination was not regular but was marked by periods in which no segments or only relatively few, were eliminated. Chains of unripe proglottides followed, and for a time few or no segments were excreted. This period of diminished excretion was often of very short duration, but sometimes lasted several weeks.

INGLEZ, A. (1937). Nota sôbre o ciclo evolutivo dos céstodos do género " Moniezia ". [**Development Cycle of** *Moniezia*].—*Rev. Med. vet., Lisboa.* **32.** 134-140.

The author tested KONSULOFF's theory [(1929). *Ann. Parasit. hum. comp.* **7.** 477.] that the transmission of *Moniezia* is by a form (named by K. a " lactocyst ") *via* the maternal milk of ewes. 3 c.c. of a suspension of *Moniezia* ova were fed daily for 60 days to two lactating ewes pastured under optimal conditions. Milk samples were taken six hours after the first administration, then daily for 15 days, and then at four-day intervals. Although Konsuloff's technique was rigidly followed, on no occasion was any body resembling a lactocyst observed.—J. P.

I. DE WAELE, A., & DE COOMAN, E. (1938). Étude expérimentale de l'echinococcose secondaire. [**Experimental Secondary Echinococcosis**].—*Ann. Parasit. hum. comp.* **16.** 121-132. 7 tables. [15 refs.] [Also appeared in *Vlaam. Diergeneesk. Tijdschr.* **7.** 215-221].

II. COUTELEN, F., LECROART, D., & COCHET, G. (1939). Sur la receptivité de la souris blanche à l'échinococcose secondaire expérimentale, par inoculation intra-péritonéale de sable hydatique d'hydatides échinococciques du cheval. [**Susceptibility of White Mice to Secondary Experimental Echinococcosis by Intraperitoneal Inoculation of " Hydatid Sand " from Horses**].—*Ibid.* **17.** 4-11. 4 figs. on 2 plates, 1 table. [7 refs.]

III. COUTELEN, F., CALLOT, J., & DESPORTES, C. (1939). Réceptivité de l'écureuil (*Sciurus vulgaris*) et du ragondin (*Myocaster coypus*) à l'echinococcose secondaire experimentale. [**Susceptibility of the Squirrel** (*S. vulgaris*) **and of the Coypu** (*M. coypus*) **to Secondary Experimental Echinococcus**].—*Ibid.* 162-166. 3 figs. on 1 plate. [11 refs.]

I. This paper records the results of the inoculation of hydatid scolices, originally obtained from a horse, into numerous laboratory animals by various routes. The method of preparation of the inoculum is described. The highest percentage of infections was obtained in white mice, when injected intraperitoneally and subcutaneously.

II. The susceptibility of white mice to intraperitoneal inoculation of equine " hydatid sand " was found to be 64·7 %. The development and characters of daughter cysts depended not only on the amount of the inoculum and the duration of the experiment, but also on individual variations for each animal. One positive reactor survived for 563 days, whilst another, which died 302 days after inoculation, exhibited an enormously distended abdomen due to multiple daughter cysts of variable size, all of which were sterile.

III. Nine rodents were injected with 0·5 c.c. of " hydatid sand " (containing about 200,000 scolices). P.M. examination later revealed cyst formation in three of them, a squirrel and two coypus. In the latter, the adventitious capsule was extremely thin. Such animals may maintain echinococcosis in countries where the disease is endemic.—M. L. BINGHAM.

SAWITZ, W. (1938). **Echinococcus Infection in Louisiana.**—*J. Parasit.* **24.** 437-439. [7 refs.]

This is a summary of reports on hydatid disease in the United States, mainly as it affects human beings. The number of human cases known to date is 391. The rarity of the condition in human beings in the United States suggests that echinococcus is also rare in dogs.

NAKATA, K. (1936). **On the Development of the Embryos of** *Ascaris lumbricoides* **in the Egg Shell.**—*J. Chosen med. Ass.* **26.** 509-520 of pt. 1. 16 figs. on 2 plates, 1 table. [Numerous refs.] [In Japanese : English summary p. 28 of pt. 2]. [Copied *verbatim* from *Helminth. Abstr.* **5.** 85. Signed R. T. L.]

Embryonated *Ascaris lumbricoides* eggs are only infective after the appearance of motile embryos which have moulted once in the shell. In mice lung invasion occurs only after eggs have been cultured for 35 days. The infective larvae are characterized by the appearance of the excretory organ and moulting in the region of the head together with the disappearance of the winding of the oesophageal lumen.

WETZEL, R., & ENIGK, K. (1938). Die Entwicklungsdauer des Pferdespulwurmes (Parascaris equorum) im Esel. [**Life Cycle of** *P. equorum* **in Donkeys**].—*Dtsch. tierärztl. Wschr.* **46.** 806-807. [Numerous refs.]

The authors infected experimentally a donkey foal on the first and second day after weaning with 100 ascarid eggs each day. On the second day there was a slight increase of body temperature, lasting three days. Between the 10th and 18th day coughing was observed, and inappetence was apparent for three weeks. Faecal examination, performed twice daily beginning with the 4th week, and daily from the 7th week, revealed eggs from the 81st day ; their number increased very rapidly for 9 days and remained constant for about 100 days.

—V. CHLÁDEK (PRAGUE).

OLAFSSON, A. (1939). Findet fortlaufend eine Ausscheidung von Spulwurm- und Lungenwurmeiern im Kot statt ? [**Excretion of Eggs of Ascaris and Lungworms in Faeces**].—*Dtsch. Peltztierz.* **14.** 198-199.

O. investigated the excretion of eggs in fur foxes from the middle of December till the middle of January. Faecal examination showed that *Ascaris* eggs were found in only 20% of the infested animals although the parasites were found in the foxes. In lungworm infestations 40% of the infested animals showed no eggs in the faeces.—A. L. WILSON.

FOSTER, A. O., & ORTIZ, P. O. (1937). **A Further Report on the Parasites of a Selected Group of Equines in Panama.**—*J. Parasit.* **23.** 360-364. 2 tables, 1 graph. [2 refs.]

This is a continuation of a study already abstracted [see *V. B.* **7.** 336, and **8.** 373]. A special study was made of strongyle parasites. In a total of 97 horses examined, strongyles belonging to 12 genera and 34 species were identified. A table shows the number of horses infected with each species, and the sites of infestation in their intestine.

WETZEL, R., & ENIGK, K. (1938). Wandern die Larven der Palisadenwürmer (Strongylus spec.) der Pferde durch die Lungen? [**Do Horse Strongyle Larvae Pass through the Lungs?**]—*Arch. wiss. prakt. Tierheilk.* **73.** 83-93. 2 figs. [Numerous refs.]

Larvae of unnamed horse strongyles, given *per os* to mice, g. pigs and rabbits, developed in the small intestine; only a few larvae entered the wall of the large intestine. Their further behaviour showed no regularity. Among mice and g. pigs no formation of nodules in the intestinal wall occurred. There is no evidence that the larvae ingested by solipeds pass through the liver, vena cava, lymphatic stream, the right heart, the lungs, the trachea or pharynx. Repeated tracheotomies and oesophagotomies of infected solipeds in order to detect the presence of the larvae remained without effect during the whole observation period of 98 days.—V. CHLÁDEK (PRAGUE).

DIKMANS, G. (1936). **A Note on *Dictyocaulus* from Domestic and Wild Ruminants.**—*J. Wash. Acad. Sci.* **26.** No. 7. 298-303. 1 fig., 1 table. [4 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **76.** 64].

The author is unable to find definite morphological characters to separate the females of *D. hadweni* Chapin 1925 and *D. viviparus* (Bloch 1782) Raill. & Henry 1907, and it is concluded that *D. hadweni* must fall into synonymy. It is pointed out that only carefully controlled feeding experiments could establish whether there are biological varieties capable of infecting only cattle or only deer, or whether these nematodes are biologically as well as morphologically identical.

WHITLOCK, S. C. (1937). **An Apparent Case of Sexual Difference in Resistance to Parasitic Infection.**—*J. Parasit.* **23.** 426.

Of 34 cases of *Syngamus trachea* infestation found P.M. in Hungarian partridges (*Perdix perdix perdix*) confined in pairs in breeding pens, 32 were female birds, and only two were males. The chances of infestation were, as far as is known, equal. W. suggests that the greater incidence of infestation in the females might have been due to lowered resistance caused by egg-production.

ALICATA, J. E. (1938). **The Life History of the Gizzard-Worm (Cheilospirura hamulosa) and its Mode of Transmission to Chickens, with Special Reference to Hawaiian Conditions.**—*Livro Jubilar Prof. L. Travassos.* pp. 11-20. 1 text fig., 5 plates, 3 tables. [5 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

The extent of gizzard-worm infestation in birds in various poultry farms in Hawaii is described. Experiments showed that grasshoppers under natural conditions harbour infective larvae of the parasite, and sandhoppers, weevils and beetles may serve as carriers.

Control measures suggested include the keeping down of weeds in poultry yards and removal of droppings. A. found that small amounts of copper sulphate would kill sandhoppers. A 1 c.c. dose of carbon tetrachloride did not cure six infested chickens. No drugs are thus far known which will affect these parasites *in situ* in the tissues.

CHAKRAVARTY, G. K. (1936). **Dirofilaria indica n. sp. from the Heart of a Dog.**—*Z. Parasitenk.* **9.** 57-60. 2 figs., 1 table. [19 refs.] [In English].

This is a detailed description of male and female dirofilaria obtained from the heart of a dog in Calcutta. The worms were compared with specimens of *D. immitis*, *D. magalhaesi*, and *D. pongoi*, and as differences were found they were named *D. indica*.

WITENBERG, G. (1938). **Studies on Acanthocephala. 3. Genus Oncicola.**—*Livro Jubilar Prof. L. Travassos.* pp. 537-560. 25 figs. [18 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

W. gives detailed descriptions of species of *Oncicola*, of which only *O. canis* is of veterinary interest. Descriptions are given of 3 specimens of *O.c.* from the U.S. National Museum, from a dog, a coyote and a turkey.

O.c. resembles *O. oncicola*, but may be distinguished from it by the cylindrical (not ring-shaped) collar, and its smaller hooks.

IMMUNITY

CABOT, D. A. E. (1938). **The Double Intra-dermal Tuberculin Test. Delayed Positive Reactions.**—*Vet. Rec.* **50.** 1233-1234.

The delayed positive reaction is described as a response to the double intra-dermal tuberculin test at the 4th or 5th day in animals which were negative at the 72nd hour. Under the Attested Herds Scheme, 318 herds tested for the first time were examined at the 72nd, 96th and 120th hours respectively. In 33 herds, comprising 655 animals, there were no reactors, while in 285 herds embracing 16,119 animals, 5,791 reacted. At the 72nd hour 11,563 were negative, 4,856 were positive, and 300 were doubtful, but at the 120th hour an additional 935 had become positive, representing 16% of the total number of reactors.

These phenomena appear to be restricted to herds tested for the first time, since 41 herds presented for attestation and tested at least twice previously showed only one delayed reactor after the 72nd hour. It is proposed, therefore, that for the tuberculin survey which embraces herds tested for the first time, the readings at the 72nd hour shall be omitted and replaced by a visit at the 96th hour.—R. E. G.

I. SMYTHE, R. H. (1939). **Tuberculin Testing: Some Notes on the Identification of Cattle.**—*Vet. Rec.* **51.** 533.

II. BLANCHARD, W. D. (1939). **Improvements in the Technique of Tuberculin Testing.**—*Ibid.* 236-238. [3 figs.]

III. BLANCHARD, W. D. (1939). **Further Observations on the Technique of Tuberculin Testing in the Field.**—*Ibid.* 534-535. 1 table.

IV. HANCOCK, R. C. G. (1939). **The Elimination of Some Variable Factors from the Intradermal Tuberculin Test.**—*Ibid.* 17-19. [4 figs.]

I. Identification difficulties in cattle are discussed. S. describes a method for temporary identification of cattle under test. A numbered disc is attached around the base of the horns by means of wire or cord secured with a marked lead seal; polled cattle have sealed cord or wire placed around the neck close to the head. The certificate of test gives ear marks, description of animal (with a map of colour markings) and details of markings on the seal. It is valid only whilst the sealed cord is intact.

II. An improvised "crush" for restraining cattle under test is described. It consists of two gates, placed parallel at a distance of 20 inches, and opening in opposite directions. A modification for use under cover is also described.

B. injects tuberculin with a dental syringe, the needle of which protrudes through a lead disc which governs the depth of the injection and permits speedy and easy use. He also uses calipers fitted with a dial which facilitates the reading of measurements.

III. B. injected pieces of skin with coloured spirit and with a mixture of coloured spirit and liquid paraffin to test depth and character of injections. He

now uses in place of the lead disc a brass ferrule on the syringe, with a piece of cork through which the needle protrudes.

IV. H. describes various ways in which the skin may be measured and the variations in the recorded measurements which follow. He recommends the use of calipers fitted with cylinder ends in place of ball points, and having on the rule a sliding block (controlled by a spring) which allows readings to be taken after the calipers are removed from the fold of skin. He considers that syringes and needles used for testing cattle should conform to a specified standard.—H. E. BYWATER.

BUXTON, J. B., & GLOVER, R. E. (1939). **Tuberculin Tests in Cattle. Observations on the Intradermal Tuberculin Test in Cattle with Special Reference to the Use of Synthetic Medium Tuberculin.**—*Rep. Ser. Agric. Res. Coun. Lond.* No. 4. pp. v+94. 11 tables, 14 charts, 2 appendixes. [Numerous refs.] [1s. 6d.]

The report opens with a general review of the application of the double intradermal test to cattle in Great Britain during the past 15 years. The improvements effected by the replacement of O.T. by synthetic medium tuberculin are described, and reasons are advanced for the selection of precipitation by ammonium sulphate for the concentration and purification of the active principle. Details are given of experiments in allergic cattle on local sensitization and desensitization which indicated that in highly sensitive animals the injection of non-specific suspensions, *e.g.* glycerin veal broth, near the site of a tuberculin reaction might induce pseudo-positive swellings. In addition to this sensitivity to non-specific products, the changes which took place in the tissues immediately adjacent to an intradermal inoculation of tuberculin were studied. It is pointed out that

" . . . in strongly allergic animals, well defined areas of increased sensitivity with a radius of two to three inches developed around the site of the original tests and lasted for a period which extended from the fifty-eighth hour up to the end of the second week. During the third and fourth weeks, however, these same areas underwent a change in the opposite direction and, in the majority of animals, became definitely less allergic, the reactions to the test dose being less marked than in other parts of the skin. Full sensitivity was regained at about the sixth week ".

Attempts to dope animals to the double intradermal test by repeated intradermal or subcutaneous injections of tuberculin were unsuccessful. It was clearly shown that unheated tuberculin protein possessed definite sensitizing potentialities and was capable, after three or four preliminary injections, of inducing reactions of a positive nature. Tuberculins which had been heated were not capable of producing this effect. It is suggested, therefore, that undenatured tuberculin should not be used for the systematic testing of cattle.

An attempt was made to sensitize normal cattle by the injection of various organisms which might induce a tuberculin sensitivity. Negative results were obtained with *Corynebacterium pseudotuberculosis*, *Actinomyces bovis*, *Actinobacillus* and *Mycobacterium phlei*.

Different results were obtained, however, with *Mycobact. tuberculosis avium* and *Mycobact. johnei*. It was found that

" during the first few weeks following infection, the animals were not only highly allergic to johnin and to avian tuberculin, but also gave definite reactions to mammalian tuberculin. It was evident, therefore, that some degree of cross reaction was to be expected during the period of maximum sensitivity. As the allergic response declined, however, the skin response to the mammalian product decreased in intensity and eventually the beasts became completely negative, while the reactions to the avian tuberculin and the johnins persisted until the termination of the experiment ".

Four calves were fed with cultures of the avian tubercle bacillus. P.M. three were free from infection, but one showed slight lesions. Transient reactions

to tuberculin were noted in the lesion-free animals, but clear-cut reactions to both avian and bovine tuberculins occurred in the fourth.—R. E. GLOVER.

TOBLER, J. (1937). Ueber die intrakutane Tuberkulinprobe beim Rinde. [**Intradermal Tuberculin Tests in Cattle**].—*Inaug. Diss., Hanover.* pp. 40. 6 figs. [Numerous refs.]

T. gives a good account, with illustrations, of the technique of the single intradermal tuberculin test, showing two types of caliper which record the measurement on a circular dial.

35 cattle were tested simultaneously with Dorset's tuberculin and with a German proprietary product, " Landesberger " tuberculin. Both kinds gave a positive reaction in simultaneous tests on 20 animals, an increase in 4 mm. of skin thickness being regarded as positive. 140 other cattle were similarly tested with " Landesberger " tuberculin and with another German product, " Perleberger " tuberculin. There were 67 positive reactions to the former and 61 to the latter. [No P.M. verifications in either of the above tests]. The necessity for standardizing tuberculin is stressed.

Finally 50 cattle were tuberculin tested, either with the American tuberculin or with both German tuberculins, and examined P.M. ; the findings agreed fairly closely and the few discrepancies are discussed.—J. E.

NEHM, M. (1937). Ueber die Agglutination des Streptococcus agalactiae. [**Agglutination of** *Streptococcus agalactiae*].—*Inaug. Diss., Hanover.* pp. 35. 6 tables. [Numerous refs.]

The agglutination test was used to examine the blood and milk from healthy and infected cows. In all 61 blood sera and 127 milk samples were examined. The titres varied from 0 to 2,000 in blood and from 0 to 200 in milk, there being no definite difference between the infected and the non-infected cows. There seemed, however, to be a significant difference in the titres of milk from infected and free quarters of the same cow. The infected quarters (19 examined) gave titres between 20 and 200, whereas in the free quarters (9 examined), the titres were all under 20.—P. S. WATTS.

HOSSENFELDER, F. (1937). Eignet sich die Blutserumpräzipitation für die Galtdiagnose beim Rind ? [**Diagnosis of Mastitis in Cattle by the Precipitation Test**].—*Inaug. Diss., Munich.* pp. 26. [18 refs.]

Extracts of 19 cultures of freshly recovered *Streptococcus agalactiae* were prepared by one of three methods :– (1) shaking, (2) saline extraction and (3) antiformin. When these extracts were tested for precipitation with two normal sera from cattle, three from horses and seven from known infected cows, many gave positive results with the negative sera and others negative results with the positive sera. It is therefore concluded that this method is not suitable for diagnosis.—P. S. WATTS.

MEYER, D. B., & HUDDLESON, I. F. (1938). **The Relation Between the Presence of Brucella Abortus and Agglutinins in Milk in Cattle Showing a Blood Agglutination Titer of 1-200 or Higher.**—*Cornell Vet.* **28.** 293-295. [Authors' summary copied *verbatim*].

In the majority of the animals studied *Br. abortus* appears in the milk before agglutinins are detected in the milk.

Br. abortus may be present in the udder for a long period without the presence of agglutinins.

Br. abortus and agglutinins may occasionally be present in the udder in the absence of agglutinins in the blood.

Approximately 12 per cent. of animals showing agglutinins in the milk in a titer of 1-100 or higher and positive milk culture become negative to the former or the latter or to both.

These data show that often times there is little, if any, correlation between the presence of *Brucella* in the milk and the presence of agglutinins in the milk.

PENNELL, R. B., & HUDDLESON, I. F. (1938). **Quantitative Studies of Brucella Precipitin Systems. I. Precipitation of Homologous Antisera by Brucella Endoantigens. II. The Precipitation of Heterologous Antisera by Brucella Endoantigens.**—*J. exp. Med.* **69.** 73-81 and 83-93. 4 figs., 12 tables. [Numerous refs.]

These two papers are not easy to abstract because they are based on previous quantitative studies [see HEIDELBERGER and KENDALL (1937). *J. exp. Med.* **65.** 647, and earlier articles] to which reference must be made for a complete understanding of the formulae involved.

In the first paper the authors claim that precipitation of homologous antibody by purified brucella antigens over a range of increasing antigen and constant antibody can be described by the formula :–

$$\text{antibody nitrogen precipitated} = 2\,RS - \frac{R^2S^2}{A}$$

where R = the ratio of antibody N to antigen N at the equivalence point, S = the amount of antigen N added, and A = the antibody N at the equivalence point. Briefly, this formula shows that the amount of antibody precipitated is increased by increasing amounts of antigen, but that this relation is not linear ; the ratio of precipitated antibody to antigen in fact decreases as the amount of antigen increases.

In the second paper the authors show that when brucella sera are precipitated by heterologous brucella antigens the resulting amounts of precipitated antibody do not follow the above equation. This confirms the fact that the three antigens are serologically distinguishable.—F. W. PRIESTLEY.

SUGAI, T. (1936). **Studies on the Sero-Diagnosis of Tuberculosis by the Complement Fixation Reaction. III. Concerning the Results of the Complement Fixation Reaction with our Improved Antigen done for the Sera of the Various Forms of Tuberculosis, Syphilis and Leprosy and the Special Reference to the Reaction and the Process of Tuberculosis.**—*Jap. J. exp. Med.* **14.** 381-385. 9 tables. [In English].

Using an antigen consisting of purified tuberculin to which lecithin had been added [*V. B.* **7.** 339.], S. carried out c.f. tests on 552 human cases of pulmonary TB., obtaining a positive result in 71% of cases as verified P.M. The intensity of the reaction increased with the severity of the lung damage and with the heaviness of the bacterial infection. There were positive reactions with 2·7% of 358 samples of serum from normal persons, in 2 out of 64 cases of syphilis and in 20 out of 22 cases of leprosy.—J. E.

KARLSON, A. G., & MCNUTT, S. H. (1939). **A Microscopic Agglutination Test for the Diagnosis of Swine Erysipelas.**—*J. infect. Dis.* **64.** 49-51. [5 refs.]

A brief review of the available literature is given. The preparation of a special liquid medium is described ; smooth, young cultures are used in preparation of antigen. Dilutions of sera with culture are made in watch glasses ; hanging drops are incubated fifteen minutes and then examined under a low power objective.

Several hundred sera were tested. Artificially infected rabbits reacted up to 1:6,400. Swine with chronic erysipelas gave titres of 200 to 400. A similar antigen gave negative results in acute outbreaks.

Better results were obtained with the microscopic than with the tube test. —F. H. MANLEY.

NUMATA, G. (1938). **Complement Fixation Reaction in Weil's Disease. Mainly on the Improvement of the Antigen.**—*Kitasato Arch.* **15.** 45-66. 16 tables. [6 refs.] [In English].

N. describes an antigen for the c.f. test in Weil's disease. Complement fixation could be obtained with sera from cases of Weil's disease using resuspended deposits of *Leptospira icterohaemorrhagiae* cultures. The sensitivity of this antigen was improved by the addition of tincture of guaiacum. An antigen prepared from the spirochaetes after the removal of protein was equally efficient. Sera from cases of Weil's disease gave a group reaction with *L. autumnalis*.—D. L. HUGHES.

DONATIEN, A., & LESTOQUARD, F. (1939). Vaccinations simultanées par le vaccin antibactéridien G.A. et la vaccin antisymptomatique. **[Simultaneous Vaccination with Anthrax G.A. "Vaccine" and with Blackleg Vaccine].** —*Arch. Inst. Pasteur Algér.* **17.** 192-193.

Twenty-seven cattle of French breed and three native ones between one and three years old were inoculated simultaneously with 0·5 c.c. of anthrax "G.A. vaccine" on one shoulder and Leclainche blackleg vaccine on the other. Neither local nor general reaction followed nor was there an activation of the piroplasmosis of which many were carriers.—G. WILLIAMSON.

ORSKOV, J. (1938). **Experimental Studies on the Sites of Antibody Formation.** —*Acta path. microbiol. scand.* Suppl. No. 38. pp. 137-142. 1 table. [In English].

It has not been easy to demonstrate differences in the amount of antibody present in different tissues and organs compared to that present in the blood.

The author observed that the antibody of vaccinia virus is present in rabbits at the site of inoculation in the skin in greater concentration than in the blood. The actual source of the antibody was not determined. The same thing occurred when the rabbits were inoculated intra-testicularly. It is considered that antibody formation is associated with the reticulo-endothelial cells.

It is possible that the difficulty of demonstrating local antibody formation with bacterial antigens is due to the close combination of the antibodies with the antigens.—F. H. MANLEY.

GREENWOOD, M., HILL, A. B., TOPLEY, W. W. C., & WILSON, Joyce. (1939). **The Effect of Withdrawing Mice from an Infected Herd at Varying Intervals.**—*J. Hyg., Camb.* **39.** 109-130. 1 fig., 8 tables. [9 refs.]

Batches of 60 mice were added at weekly intervals to a mouse herd infected with *Salmonella typhi-murium*, and a proportion of the added mice removed and isolated after exposures of 7, 14, 21, 28 and 35 days in the infected herd. The disease in the herd differed from previous results in herds to which small numbers of new individuals had been added at a time, in that during the earlier days of cage age, the mortality was not so high, but the level of mortality was maintained to a cage age of at least 70 days, instead of the rapid fall consistently observed in herds to which small continuous additions are made. The infection rate in mice withdrawn from the herd after 7 days' exposure is estimated at 34%, and after 14,

21, 28 and 35 days at 56%, 65%, 69% and 79% respectively. The change of environment from herd life to isolation in single cages was found to have a detrimental effect, but in spite of this, comparison of the mortality amongst withdrawn mice with that of animals remaining in the herd showed that withdrawal was advantageous at any period up to 35 days, the earlier the withdrawal the greater being the benefit. The results also confirm the previous findings that the rate of infection in a herd cannot be accounted for by any law based on a constant average risk of infection throughout life. It appears that there must be some factor which renders mice less susceptible to a change from the uninfected to the infected state as cage age advances.—U. F. RICHARDSON.

DISEASES, GENERAL

I. HAUPT, H. (1938). Die Rinderställe und die Verbreitung von Tuberkulose, seuchenhaftem Verkalben und gelbem Galt unter den Rindern eines sächsischen Dorfes. [**The Effect of the Type of Cattle Byre on the Spread of Tuberculosis, Contagious Abortion and Mastitis**].—*Z. InfektKr. Haustiere.* **53.** 49-51.

II. KÖTZSCHKE, J., WAUER, H., STEGER, G., & KRENKEL, K. (1938). Die Rinderställe. [**Cow Byres**].—*Ibid.* 51-61.

III. SCHULZE, H., zu BARGHOLZ, M., MINCK, & SCHÄFER, R. (1938). Die Tuberkulose. [**Tuberculosis**].—*Ibid.* 61-64.

IV. MODES, E., HILL, W., LUCHMANN, H., & BOSSE, W. (1938). Das seuchenhafte Verkalben. [**Bovine Contagious Abortion**].—*Ibid.* 64-66.

V. WEHSER, E., GROSSE, G., & WIEGAND, H. (1938). Der gelbe Galt. [**Streptococcal Mastitis**].—*Ibid.* 66-68.

VI. WAUER, H. (1938). Zusammenfassung der Seuchenuntersuchung. [**Summary of Articles I-V**].—*Ibid.* 68-72. 1 table.

A series of brief addresses aimed at stressing the importance of hygiene and, in particular, properly planned byres, in the control of contagious disease. Cow byre planning is discussed and it is stressed that in judging the suitability or otherwise of a byre, attention must be paid to adequate ventilation and drainage, the certainty that food cannot be contaminated with excreta, roominess of all gangways and the provision of efficient quarantine boxes and calf pens.

The high incidence of bovine tuberculosis, contagious abortion and mastitis and the heavy economic losses caused by these infections is stressed. It is pointed out that on many farms eradication of these diseases is rendered impossible because adequate stabling accommodation is not available.—E. J. PULLINGER.

MIÈGEVILLE, J., & ZOTTNER, G. (1939). Lupinisme et piroplasmose au Maroc. [**Lupinism and Piroplasmosis in Morocco**].—*Bull. Acad. vét. Fr.* **12.** 161-163. [Also appeared in *Maroc méd.* **19.** 194].

The authors discuss the differential diagnosis of piroplasmosis and lupin poisoning.—N. J. SCORGIE.

GUERRERO, R. P. (1938). Enfermedades de los cerdos. [**Pig Diseases**].—*Rev. Cam. Agric. seg. Zona., Ecuador.* **1.** No. 9. 53-56. 2 figs.

G. speaks of the heavy parasitic infestation among pigs in the littoral belt of Ecuador, but apart from verminous bronchitis these conditions are not specified. There is a high mortality rate from swine fever and from haemorrhagic septicaemia. Pig paratyphoid occurs but is not prevalent. The usual prophylactic and curative inoculations are employed.—J. PASFIELD.

—. (1939). **Report of the Special Committee on Poultry Diseases. [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **94.** 311-313.

The committee stresses the chaotic methods and varied personnel dealing with poultry diseases in U.S.A. It recommends the formation of a special committee to study this problem and, especially, what responsibility the veterinary profession should undertake. It emphasizes that live poultry should be inspected by veterinarians under the Bureau of Agricultural Economics' scheme, and also recommends an amendment of the Meat Inspection Act so as to include poultry.

In view of continuing outbreaks of infection with *Erysipelothrix rhusiopathiae* (the bacillus of swine erysipelas) which have occurred in turkeys since 1935 and its spread to several states, an attempt to determine the source of infection (sheep and fish-meal are suspected) is advised. The geographic and host distribution of poultry parasites, including blood parasites, require investigation. Because wild birds may act as reservoirs of infection for common poultry, examinations of all species of birds, especially game birds, are recommended in order to acquire all the information possible. The importance of correct differential diagnosis of tumours histologically and by transmission tests is stressed, and the standardization of examination methods for the diagnosis of respiratory diseases is advised.

General criticism of the United States National Poultry Improvement Plan is directed chiefly against certain provisions relating to control of *Salmonella pullorum* infection, such as, (a) if only 10% reactors are found the flock is classed as " United States pullorum-tested breeding chickens ", (b) only breeding stock need be tested, and (c) the test need not be under supervision by a proper Live Stock Sanitary Officer. In the opinion of the committee these provisions are all contrary to successful eradication principles. Finally, the committee recommends that a revised nomenclature of poultry diseases be included in its forthcoming report to the next annual meeting of the Association.—C. V. Watkins.

Kaura, R. L. (1937). **Common Contagious and Parasitic Diseases of Poultry and Their Control.**—*Agric. Live-Stk India.* **7.** 745-755. 14 figs. on 3 plates.

There is a brief review of common poultry diseases in India. The need for correct management, breeding and feeding of poultry for the maintenance of freedom from disease is emphasized, and the essential measures for control of poultry disease are outlined. Newcastle disease is widespread in India. Wild birds, especially crows, assist in its spread. Serum of recovered birds (2·5-5 c.c. doses), followed in 24 hours by an infective dose of virus, confers a solid immunity. [This is not the usual experience : most workers consider that this method does not give satisfactory results].

Fowl plague has not been observed. In chronic fowl cholera cases, wryneck, following localization of *Pasteurella aviseptica* in the brain, has been noted. Antiserum to lessen losses, and vaccine in enzootic outbreaks are recommended. Serious losses occur from avian tuberculosis of fowls, and other birds, especially when in captivity. It is said to be slow in onset and therefore rare in growing chicks [rarely diagnosed in growing chicks is probably more correct]. Bacillary white diarrhoea, fowl typhoid and coccidiosis all appear to cause more or less severe losses.—C. V. Watkins.

Stenius, P. I. (1939). Sjukdomar i våra pälsdjursgårdar. **[Diseases of Fur Animals in Finland].**—*Suom. Eläinlääkäril.* **45.** 23-31.

Abortion in fur animals is often due to deficiency disease. Hairlessness in the young is caused by vitamin A deficiency, and vesicles on the pads of young animals are considered by some authors to have their origin in what is known as

a haemorrhagic diathesis which may be dependent upon nutritional deficiency. The nutrition of fur animals should therefore receive particular attention. Parasitic and infectious diseases are of frequent occurrence, but over-feeding and food poisoning are also common. Paratyphoid is the most prevalent of the infectious diseases. In controlling this disease, hygienic precautions should be taken, but immunization also gives good results. Most loss is due to distemper; no effective means of protection is known. Slaughter of infected animals, strict hygiene, isolation and adequate mineral rations are measures advised. Various antisera have all given unsatisfactory results except in mink; English distemper antiserum has been of considerable value in mink.—R. STENIUS.

GRIEDER, H. (1938). Krankheiten des Harn- und Geschlechtsapparates bei unseren Pelztieren. [**Uro-Genital Diseases of Fur Animals**].—*Dtsch. Pelztierz.* **13.** 405-407. 3 figs.

Calculus formation sometimes occurs in male fur animals bred and kept in captivity. In nutria and racoons it occurs all the year round, but in foxes and mink chiefly in January and February.

After parturition or abortion fox vixens are sometimes affected with cystitis, nephritis and peritonitis, secondary to metritis following retention of the placenta.

The symptomatology is discussed.—SASSENHOFF (MUNICH).

I. MILLEN, T. W., & EVELETH, D. F. (1938). **Chemical Changes in the Serum Associated with Equine Encephalomyelitis and Moldy Corn Poisoning in Horses.**—*Vet. Student.* **1.** 20-22. 2 tables. [8 refs.]

II. HEAD, C. (1939). **Equine Encephalomyelitis not Infectious in Saskatchewan.**—*Vet. Med.* **34.** 431-433.

I. A comparison was made of the serum of horses affected with infectious equine encephalomyelitis and with mouldy corn poisoning. In the former disease the inorganic calcium content is normal or slightly depleted, and the inorganic magnesium is significantly lowered. In mouldy corn poisoning, however, the calcium is noticeably lowered, while the magnesium remains normal. Sugar content determinations in encephalomyelitis cases indicated that there was no marked disturbance of carbohydrate metabolism, but Van den Bergh tests detected hyperbilirubinaemia in three out of five cases of the disease.

Injection of mouldy corn extract caused a depletion of serum calcium similar to that caused by feeding mouldy corn. In one animal with incoordination, however, the calcium level rose to 14·7 mg. per 100 c.c. Autopsy revealed that one of the parathyroids was enlarged and contained a cyst 2 mm. in diameter.

II. The non-infectious type of equine encephalomyelitis due to the ingestion of mouldy food or stale water occurs in Saskatchewan and neighbouring districts, and outbreaks sometimes assume the proportions of local epizootics. The disease subsides rapidly on removal of the offending factor. Initial differentiation between it and infectious equine encephalomyelitis is difficult because of clinical similarity and the possibility of existence of both conditions in the same district.—D. D. O.

I. FINDLAY, G. M., & MACCALLUM, F. O. (1937). **Note on Acute Hepatitis and Yellow Fever Immunization.**—*Trans. R. Soc. trop. Med. Hyg.* **31.** 297-308. [Numerous refs.]

II. FINDLAY, G. M., & MACCALLUM, F. O. (1938). **Hepatitis and Jaundice Associated with Immunization against Certain Virus Diseases.**—*Proc. R. Soc. Med.* **31.** 799-806. [12 refs.]

III. PROPERT, S. A. (1938). **Hepatitis after Prophylactic Serum. [Correspondence].**—*Brit. med. J.* Sept. 24th. 677-678. [4 refs.]

I. A preliminary account of some of the cases described more fully in II.

II. Among 3,100 persons immunized against yellow fever with virus and convalescent serum, 89 cases of jaundice were traced. The symptoms were those of a hepatitis and closely resembled those produced by common infective hepatic jaundice. Attention is directed to the occurrence of hepatitis in horses, usually two or three months after immunization against the virus of horse sickness (Theiler, 1919) and against that of equine encephalomyelitis [see *V. B.* **8.** 572, and MARSH, below]. The authors also refer to similar experiences after the injection into horses of horse serum containing antitoxins against *Clostridium welchii* toxin in an attempt to prevent " grass sickness ". The clinical syndrome in horses affected in this way has been given the descriptive term of " staggers ", while pathologically the main feature was acute degeneration of the liver parenchyma in the centre of the lobules. Similar symptoms were observed, though to a lesser extent, in a few normal horses. The only factor common to the inoculated horses and men was the injection of homologous proteins, either in sera or in tissue extracts. The only theories which at present explain the observed facts are that either (1) a hepatotoxic virus is introduced with the virus inoculum, or that (2) two factors combine to induce hepatitis—(a) a hepatotoxic substance present in the homologous sera or tissue extract injected and (b) an infective agent which, at least in the case of human beings, is probably the causal agent of common infective hepatic jaundice.

III. A brief note recording the occurrence of hepatitis and jaundice in seven children who were inoculated with convalescent measles serum as a prophylactic. Symptoms developed 78-83 days after inoculation, and in the early stages the disease was indistinguishable from common infective hepatitis, although the later stages were more severe and terminated in death. Two months after the above cases of jaundice appeared, two uninoculated children developed jaundice indistinguishable from the common infective hepatitis. P. considers that these cases confirm the second theory advanced by FINDLAY and MACCALLUM [see I above].

—N. J. SCORGIE.

MARSH, H. (1937). **Supplementary Note to Article on Equine Encephalomyelitis.** —*J. Amer. vet. med. Ass.* **91.** 330-331. [1 ref.]

M. refers to the similarity between deaths that occurred after immunization against equine encephalomyelitis [*V. B.* **8.** 572.] and acute liver atrophy of horses immunized against African horse-sickness [THEILER. (1919). *5th & 6th Rep. Direct. Vet. Res. S. Africa*].

M.'s 89 cases (1·5 % of all horses immunized) in Montana became ill 32-92 days after immunization by serum and virus or serum alone. He suggests that serum treatment followed by exposure to the virus played a part in the genesis of the liver syndrome [see also COX *et al. V. B.* **9.** 540].—J. E.

KUCEL, J. (1938). Izvještaj o pojavi jedne po kliničkim simptomima Borni (meningo-encephalomyelitis equorum) slične bolesti kod konja na području sreza Veliko Goričkog. [**Record of a Disease of Horses Simulating Borna Disease in the District of Velika Gorica (Yugoslavia)**].—*Jugoslov. vet. Glasn.* **18.** 501-504. 4 figs. [3 refs.]

Towards the end of the summer of 1938, a previously uninvestigated disease broke out among horses in the district of Velika Gorica (southern vicinity of Zagreb, Yugoslavia). The disease set in suddenly and appeared to be a nervous infection; the body temperature was slightly above normal. The symptoms

resembled those of Borna disease, but an intense yellow atrophy of the liver was found. Within less than two months 442 horses contracted the disease. No successful mode of treatment was found. The disease [now called "Mraclin" disease, the name being derived from the village where it was first observed in the district of V.G.] is now being studied at the Veterinary College, Zagreb. K. is of the opinion that the condition may be identical with that described by BERNHARDT [(1928). *Tierärztl. Rdsch.* **34.** 341]. [It might be of interest to compare these cases with those described in connexion with equine encephalomyelitis in the two immediately preceding abstracts].—B. OSWALD (KRIŽEVCI).

TODD, A. G., & SOUTAR, J. J. M. (1939). **Influenza.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 1202-1213. [6 refs.] [In English: French, German and Italian summaries. Discussion pp. 1233-1237 in English and French]. [Reprinted in *Vet. Bull. U.S. Army.* **33.** 146-158].

Under peace-time conditions equine influenza is usually not very prevalent, but in war-time it may assume formidable proportions owing to the concentration of large numbers of animals in small areas. Horses which contract the disease under favourable conditions of health and environment vary somewhat in their reactions, but serious complications are very rare. On the other hand cases which arise in unfavourable circumstances such as in the course of shipping, on lengthy train journeys, or during adverse climatic periods, are usually complicated by pneumonia or other sequelae. The period of convalescence depends largely on the previous condition of the animal. Well-conditioned acclimatized horses in India have recovered in two or three weeks, while newly-landed animals required six to twelve months before they were fit for service.

In the field the most successful method of dealing with the disease appears to be complete cessation of all work in infected units, with entire rest during the pyrexia stage. The animals are allowed to remain at liberty in paddocks, but are strictly isolated. After severe symptoms subside they are walked in hand, and subsequently if they can be trotted without coughing they are gradually returned to work. Fast work early on predisposes to strains and roaring and is therefore to be avoided. In the benign type of the disease the policy of mixing infected and non-infected animals is justified, and is probably the best way of reducing the duration of an outbreak to a minimum.

Recently the intravenous injection of 3 g. of neosalvarsan in 60 c.c. of distilled water has given excellent results in the medicinal treatment of severe cases.

—D. D. OGILVIE.

MINTSCHEW, P. (1938). Ueber die Aetiologie, Therapie und Prophylaxe der Mondblindheit. [**Aetiology, Therapy and Prophylaxis of Equine Periodic Ophthalmia**].—*Tierärztl. Rdsch.* **44.** 748-753 and 761-769. 1 fig., 3 tables, 1 chart. [Numerous refs.]

M. suggests the theory that periodic ophthalmia is caused by intoxication by histamine or by an agent with a comparable action present in the blood of affected horses. He states that he set up the disease in horses by an intra-arterial injection of histamine. He considers that it is possible that histamine is produced in some way by digestive derangement, and suggests that laminitis may be a manifestation of histamine poisoning. He discusses curative treatment, giving considerable detail about drugs used, and advocates a preventive method depending on periodical dosage with lactic acid and pilocarpine.—V. CHLÁDEK (PRAGUE).

WESTHUES, M. (1938). Ueber das Wesen, die Diagnostik und die Therapie der Podotrochlitis chronica des Pferdes. [**Nature, Diagnosis and Therapy of Navicular Disease of Horses**].—*Berl. Münch. tierärztl. Wschr.* Dec. 23rd. 781-785 and Dec. 30th. 797-802. 19 figs. [3 refs.]

From numerous examinations of the feet of horses selected at random after death, W. found that degenerative changes on the deep surface of the navicular bone and on the opposed surface of the deep flexor tendon are very common in horses from eight years of age upwards. The change starts on the surface of the tendon, which in the early stage shows a change of colour, a loss of transparency of the surface layer, and later small erosions and exposure of the tendon fibres. Microscopically the cells of the tendon tissue show lipoid degeneration, and necrosis.

The navicular bone becomes affected secondarily and shows similar changes. The condition is called podotrochlosis, and it is essentially degenerative and not inflammatory. Inflammation, as opposed to the degenerative surface changes referred to above, only occurs in the deeper parts of the tendon and navicular bone when the podotrochlosis is advanced.

W. believes that podotrochlosis is the result of overburdening of the forelegs; it occurs chiefly in riding horses. Diagnosis and treatment are discussed in detail.

—V. CHLÁDEK (PRAGUE).

MÜLLER, E. (1939). Ueber den Beginn der Hufknorpelverknöcherung. [**The Genesis of Sidebones**].—*Tierärztl. Rdsch.* **45.** 90-92. 2 figs. [10 refs.]

M. examined the feet of horses before and after slaughter and studied closely 41 lateral cartilages. In 17 cases the cartilages had become more or less ossified, the process starting at the point of attachment to the third phalanx, and in 10 cases there were ossification centres in the cartilage remote from the point of attachment. With regard to pathogenesis it was observed that the ligaments of the lateral cartilages exert traction on the cartilages when the pastern is at a steep angle with the ground; this evidently causes some irritation at the junction of cartilage and ligament and it is there that ossification commonly starts. The cause of isolated ossification is obscure.

The histological character of incipient ossification is described.

—V. CHLÁDEK (PRAGUE).

ERLER. (1938). Beitrag zu Ursache und Wesen des Blutschwitzens der Pferde. [**Causes and Nature of Blood Sweating in Horses**].—*Z. Veterinärk.* **50.** 514-521. 1 fig. [14 refs.]

E. examined 20 affected imported horses whose average age was nine years. With the appearance of hot summer weather nodules the size of hazel nuts were seen in the skin, as many as 60 nodules being seen in one horse alone; there was blood exudation from these nodules, and this appears to be the reason for the term used in the title. The nodules were solid and did not cause any pain. Examination of the blood revealed the following:– (1) no microfilaria were found in any of the subjects, (2) lymphocytosis and neutropenia were seen in 45% of the horses, (3) 20% showed eosinophilia, and (4) 40% showed a diminution in the number of erythrocytes. E. concludes that the condition was not of parasitic origin.—A. L. WILSON.

I. RADTKE, G. (1938). Untersuchungen über die Ursache und das Wesen der Schnüffelkrankheit des Schweines. [**Cause and Nature of Infectious Rhinitis of Swine**].—*Arch. wiss. prakt. Tierheilk.* **72.** 371-423. 26 figs., 16 tables. [Numerous refs.]

II. RADTKE, G. (1938). Die Ursache und das Wesen der Schnüffelkrankheit des Schweines. [**Cause and Nature of Chronic Rhinitis in Swine**].—*Berl. Münch. tierärztl. Wschr.* October 21st. 637-639. [1 ref.]

I. A careful anatomical, histological and bacteriological examination of the upper respiratory tract was made on groups of healthy and affected pigs. The morbid anatomy and histopathology of infectious rhinitis and influenza are described. It was found that rhinitis leads to chronic changes ending in atrophy of the parts and occlusion of the nasal cavities and sinus. Whereas in healthy stock the ethmoid sinuses and nasopharynx were practically free of bacteria, in 40% of infected animals the influenza bacillus was recovered from these parts. When healthy stock was injected intranasally with secretion from pigs with rhinitis, a bronchopneumonia such as that which occurs in influenza was often induced; conversely, material from lung lesions in influenza cases caused rhinitis. The conclusion drawn is that infectious rhinitis is a chronic form of influenza localized in the upper respiratory tract. [The possibility of the two diseases being present together in the inocula does not appear to have been eliminated.] [See also *V. B.* **8.** 39 and 526].

II. An abbreviated article summarizing the above.—P. S. WATTS.

RUDAU, J. (1939). Zur Frage des akuten Herztodes der Schweine. [**On the Question of Syncope in Pigs**].—*Tierärztl. Mitt.* **20.** 65-67.

R. asserts that in East Prussia ten times as many pigs are lost from syncope as from other diseases and that the associated heart disease is a sign of poisoning by zinc or, less often, by copper compounds. The number of pigs affected increases year by year as more zinc vessels are used. Steam under high pressure removes particles of zinc from zinc surfaces, and such a process may occur when food is being cooked in a zinc vessel if little water is used, so that the particles of zinc may thus contaminate the food. If, however, the vessel is filled with water the reaction does not take place. The use of iron steamers is advocated. Again, zinc lactate may be formed when very sour milk is kept in zinc pails for a long time.—G. WILLIAMSON.

ANON. (1938). **Stiff Lamb Disease in Illinois.** pp. 1. Urbana, Ill.: University of Illinois. [4to] [Mimeographed].

This disease has been reported from several eastern and far western states, and seems to be increasing in flocks in Illinois. A paralysis occurs in lambs two to eight weeks old, and the greatest losses are amongst those turned out to pasture. The cause is unknown, but the disease has not been found in " hot-house lambs " [presumably lambs being fattened] and rarely in late lambs.

Within a few days the affected lambs die from starvation and exhaustion following paralysis; growth is impaired in the few animals which recover.

In advanced cases nearly all the muscles of both the fore and hind limbs are affected; the lesions are degenerative and not inflammatory in character, and negative results of cultural and inoculation tests show that they are not due to bacterial invasion.

No specific preventive measures can be recommended until there is definite proof of the aetiology of the disease, but it is suggested that diets containing a minimal amount of protein should be fed before and after lambing.

NÖRR, J. (1938). Massensterben von Lämmern durch Herzmuskelverkalkung mit dem klinischen Befund von Extrasystolen. [**Losses among Lambs from Calcification of the Heart**].—*Arch. wiss. prakt. Tierheilk.* **74.** 25-38. 8 figs. [Numerous refs.]

Sixty of a flock of winter lambs died early in the year, the majority during mild, wet weather. The cause was neither infection nor parasites. All the affected animals came from one fold, under which a dowser had stated that three streams met. The affected lambs had wart-like nodules on the lips; there was debility and the pulse was irregular. Yellow, opaque calcareous foci were scattered throughout the myocardium, but the skeletal musculature was free from such foci. No more cases occurred after the sheep were turned out to pasture. Three lambs recovered in the author's clinic. The exact cause of the condition was not determined.—V. Chládek (Prague).

Sjöberg, K. (1938). Blodets kemiska sammansättning. I. Förändringar i samband med partus hos ko. II. Vid puerperal hämoglobinemi hos nöt. [**Chemical Composition of the Blood. I. Of Parturient Cows. II. In Bovine Puerperal Haemoglobinaemia**].—*Svensk VetTidskr.* **43.** 285-305 and 335-345. 5 figs., 6 tables. [Numerous refs.] [See also *V. B.* **3.** 221].

I. Physiological variations in the chemical composition of cows' blood in relation to parturition were investigated. Blood samples were collected from six cows at varying intervals from 98 days before parturition to 51 days after. Analyses were carried out of the concentrations of the undermentioned constituents only.

Soon after parturition the inorganic P of the blood plasma as well as of the corpuscles decreased to about one third of the normal level. In the corpuscles the minimum concentration was reached 1-2 days later than in the plasma. The content again returned to normal in a few days. The concentration of phosphoric acid esters in the corpuscles showed tendencies similar to those of the inorganic P. The phospholipid and cholesterol contents decreased a few days before parturition, remained low for 2-3 weeks and then rose. The cholesterol/lecithin ratio and the action of the plasma phosphatase showed only slight alterations, with, however, a certain decrease in parturient cows.

II. The chemical composition of the blood of 25 cows naturally affected with puerperal haemoglobinaemia were examined [for a description of the disease see Hjärre (1930). *Acta path. microbiol. scand.* Suppl. No. 7]. The blood of four cases of non-puerperal haemoglobinaemia was included for comparison, as was the blood of some of the cows after recovery, that is, 5-8 weeks after parturition.

The analyses proved that the concentration of inorganic P in the plasma was very low, in some cases only one tenth, of that of the blood of healthy cows at the same stage after parturition. In healthy cows no phosphoric acid esters are present in the plasma, but in affected cows traces, up to 2·8 mg. %, were found. In some cases the inorganic P content in the corpuscles was decreased, but as a rule it remained normal. The concentration of phosphoric acid esters in the corpuscles varied considerably and was in some cases very low. The lecithin and cholesterol concentrations varied within normal limits.

In connexion with the finding of the low P concentration in the blood, several hay samples from the districts where the disease prevails were analysed. Ca was high, whereas P was significantly low, a fact that might be a contributory cause to the low P concentration in the blood. Other explanations are also discussed.
—Gustav Naerland (Oslo).

Fooy, J. P. (1936). Over de renale en extrarenale uraemie bij onze huisdieren. [**Uraemia in Domestic Animals**].—*Tijdschr. Diergeneesk.* **63.** 649-659. [6 refs.] [English, French, and German summaries].

After giving a brief account of the symptoms of uraemia in domestic animals, F. discusses two cases observed by him in horses. At autopsy these animals were

found to have suffered from obstruction of the oesophagus and of the colon, while their kidneys were normal, indicating that uraemia was extrarenal.

TOMAN, R. V. (1937). Ervaringen met de behandeling van de steriliteit bij de merrie. [**Treatment of Sterility in Mares**].—*Tijdschr. Diergeneesk.* **64.** 1222-1225. [German summary].

T. describes his technique for examining mares, and gives his general experience in practice. He advocates exploration and treatment of the uterine cavity through the os uteri at the oestral periods. [There appear to be objections to this system].—JAC. JANSEN (UTRECHT).

I. POTEL, K. (1938). Histologische Untersuchungen zum Wesen der sogenannten Marek'schen Geflügellähme.—[**Histological Research on Fowl Paralysis**].—*Z. InfektKr. Haustiere.* **54.** 143-154. 1 fig. 1 table. [9 refs.]

II. FRITZSCHE, K. (1938). Kritische Betrachtung zur Aetiologie der Marek'schen Hühner-Lähme. [**Aetiology of Marek's Fowl Paralysis**].—*Dtsch. tierärztl. Wschr.* **46.** 791-794. [Numerous refs.]

I. P. examined the internal organs and nerves of 32 hens with clinical fowl paralysis. In 10 of them there were macroscopic new growths in the internal organs and in a further 8 cases there was found a lymphocytic infiltration of the internal organs and also of the nerves. A detailed examination of the latter showed the presence of large numbers of lymphocytes and lymphoblasts which showed signs of mitosis and degeneration. The destruction of nerve fibres in this disease is not primary but secondary, being caused by pressure from the above cell overgrowths which originate in the connective tissue of the nerve fibres and bundles. The whole process is neoplastic in nature and not inflammatory. This observation supports the assumption that fowl paralysis and fowl leucosis are etiologically related.

II. This is a general survey of research into fowl paralysis. There is to-day no doubt that F.P. is transmissible artificially, and in various experiments positive results have varied between 5% and 80%. For instance, JUNGHERR obtained positive results in 38·2% of cases and HARTWIGK 80% positive results, in attempting to produce the disease in the offspring of infected hens. The great differences in the results of different workers can be explained by the assumption that F.P. is essentially a disease of very young birds, and that the causal agent is very variable in virulence. Many birds seem to have a strong natural resistance against the disease, and attempts to affect such birds experimentally usually fail. Another difficulty has been due to the choice of control birds, which develop F.P. presumably because they are from stocks in which it has occurred. Some workers have reported natural infection from contact and from the ingestion of the excreta of affected birds (SEAGAR, FRITZSCHE and JUNGHERR). Some authors believe that there is a hitherto unknown causal factor, possibly operating by way of nutrition or constitution, though the work of LERCHE, FRITZSCHE and HEPDING has failed to indicate any connexion between F.P., diet and general management.

F. has failed repeatedly to demonstrate any spontaneous outbreak of F.P. in which it was possible to exclude the possibility that the disease originated from previously affected animals.

PACINI, and also BUTLER and WARREN, have demonstrated that paralysis other than F.P. can be caused by vitamin E deficiency, but that has evidently nothing to do with the condition known as fowl paralysis, as cases of the former can be cured but not cases of F.P. Since wheat has been forbidden for use as poultry food in Germany, F.P. has not increased.

It is believed that susceptibility is connected with a certain constitutional state of receptivity, though experiments on this point have not given any direct evidence that the state is inherited and it has not been possible to breed strains of fowls having a definite tendency or resistance to F.P.

The causal agent of F.P. passes through filter candles and remains viable for some months in 50% glycerin. The enzyme theory of LESBOUYRIES, found by experiment, is not supported by JUNGHERR who was able to produce the disease with nerve material which had been dried for 82 days.

For control purposes the author has had some success with the employment of hygienic measures.—SASSENHOFF (MUNICH).

BARBER, C. W. (1939). **A Study of Fowl Paralysis. Part I. Antemortem Diagnosis.** —*Cornell Vet.* **29.** 41-44. 1 table. [4 refs.]

B. describes a method of diagnosis in the living bird based on exposure and examination of the sciatic nerve for macroscopic changes.

Twenty-one birds with neurolymphomatosis gallinarum, many of which were shown by the operation described to be affected, daily received by the mouth one or two 1 c.c. capsules containing cold, pressed wheat germ oil. The course of the disease was not affected by the administration of the oil.—L. E. HUGHES.

WARREN, D. C. (1937). **Physiologic and Genetic Studies of Crooked Keels in Chickens.**—*Tech. Bull. Kans. agric. Exp. Sta.* No. 44. pp. 32. 3 figs., 15 tables. [7 refs.]

This bulletin details experimental study of "crooked keel" in chickens from 1926-1937 at the above experiment station. The age incidence of the deformity was most frequently between 6 and 12 weeks, but cases occurred in affected strains up to 6 months or later. Chemical analysis of the breast bones showed that there was a lower dry ash percentage in affected strains than in straight-keeled birds, but the analysis of leg bones from each group was similar. The growth rates and fecundity of affected birds was normal and there was no increased susceptibility to rachitic conditions. The period of hatching had no bearing on the incidence of the condition.

A genetic study conclusively demonstrated an inherent tendency to the development of crooked keels in some strains. However, the conditions of roosting, especially the age at which this commenced, the sharpness of the perches and the conditions of husbandry (overcrowding, etc.) which in turn determined the relative amount of perching time, had their effect upon the incidence of the disease in the experimental groups, and even counteracted the hereditary tendencies. Male birds were found to be more susceptible to the deformity than females.—C. V. W.

JÁRMAI, K. (1938). Ueber die Wirksamkeit der Eiweissfraktionen bei der übertragbaren Hühnerleukose. [**Action of Protein Factors in Transmissible Fowl Leucaemia**].—*Arch. wiss. prakt. Tierheilk.* **73.** 295-300. [4 refs.]

A strain of erythroleucosis was maintained for eight years in fowls without changing type, the causal agent being firmly tropic for the erythropoietic system. The incubation period of the strain was at first 10-12 days, or 20 days if the material was preserved in glycerin; in the course of the eight years the incubation time gradually became shorter, the shortest period being seven days. The shorter the incubation period, the lower was the pathogenicity. While the period was still more than 14 days, it showed seasonal variation, being longer in January-June than in July-December. Globulin and albumin of hens' blood were tested for their pathogenicity by the technique employed by VON MÓCSY [see p. 848.] in

equine infectious anaemia. It appeared that the causal agent of fowl erythroleucosis is connected with the globulin fraction, and hardly at all with the albumin fraction. The globulin fraction of hens' blood retains its virulence despite flocculating out in saline suspension. This fact suggests that the causal agent cannot be a living organism. Neither the disease nor immunity against it can be produced by dried globulin.—SASSENHOFF (MUNICH).

SCHÄPER, W. (1938). Enstehung und Bekämpfung der Rinderleukose im Lickte der Konstitutionsforschung. [**Development and Control of Leucosis in Cattle in the Light of Research into Constitution**].—*Dtsch. tierärztl. Wschr.* **46.** 833-837. [Numerous refs.]

The incidence of this disease in Germany appears to be rising and its distribution is more wide-spread than when the first work dealing with it was recorded in 1917. Animals of the " schwartzbunten Niederungsvieh " breed are most commonly affected, those of other breeds being relatively free from the disease.

Evidence is cited in support of the view that certain animals may produce progeny in which the incidence of the disease is especially high. It is stressed that affected cattle of either sex and their parents and grandparents should be excluded from breeding.

Such factors as high milk production, environmental conditions and tuberculosis are not known to have any effect on the incidence of the disease. S. uses the word " constitution " to mean the general state of the animal, including both inherited and acquired characters [see *V. B.* **7.** 48].—E. G. WHITE.

SAAR, W. (1937). Koduloomade lüfomatoos ja selle hinnang lihavaatuses. [**Lymphomatosis in Animals and Its Meat Inspection Aspect**].—*Eesti loomaarstl. Ring.* **13.** 158-163. [11 refs.]

Lymphomatosis is rare in Estonia. S. has only observed four cases among 12,000 head of cattle slaughtered and two cases in 40,000 pigs.

According to the meat inspection regulations affected bovine carcasses are condemned as not being fit for human consumption. In pigs, affected lymph nodes and tissues are removed and the pork given to the owner with the instruction that it should be well boiled before consumption.—ELFRIIDE RIDALA (TARTU).

KIPPER, A., & KEERD, M. (1937). Veiste nn. neurofibromatoosist. [**Nerve Tumours in Cattle**].—*Eesti loomaarstl. Ring.* **13.** 185-210. 12 figs. [Numerous refs.] [German summary].

At the abattoir of Tartu in the year 1935 neurofibromatosis was diagnosed in 1·8% of all the cattle slaughtered in one month, and in 1·3% in another month. From October 1st 1935 till January 1st 1937, 54 cases were diagnosed; 20 of the cases were studied in detail. The disease occurred more frequently in old cows, and tumours were most often found in the intercostal nerves, the nerves of the brachial plexus, the cardiac and thoracic part of the aortic plexus, and more rarely in the nerves of the oesophagus, neck and tongue, and in the nerves of the mesentery. The histological examination showed that nine cows had sarcoma, five fibrosarcoma, three fibrosarcoma and sarcoma, and three sarcoma, fibrosarcoma and fibroma. All the tumours examined were surrounded by a layer of connective tissue formed by the thickening of the perineurium. Histological examination showed that the tumours originated in the endoneurium. As the tumours grow bigger, the neighbouring nerve fibres are compressed, which results in a disturbance of the lymph and blood circulation, the tumours become oedematous and hollow spaces appear filled with a gelatinous coagulable fluid. The hollow spaces are enlarged interfascicular lymph spaces that communicate with

subdural and subarachnoid spaces; they are not enlarged lymphatic vessels as some authors maintain. The transition between fibroma and fibrosarcoma, and between the latter and sarcoma is not always easy to fix histologically, because sometimes intermediate forms occur. The tumours that are histologically malignant were usually of larger dimensions. In all the tumours examined there was perivascular lymphocytic infiltration. Sacomata originate between the nerve fibres and, as they grow they compress the nerve fibres. All sarcomata found were spindle-celled.—ELFRIIDE RIDALA (TARTU).

NICKEL, R. (1939). Blut- und Lymphgefässsystem des Darmes als Infektionspforte. I. Bestehen direkte Verbindungen zwischen den Darmlymphgefässen und der Pfortader. [**The Blood and Lymphatic Systems of the Intestines as Infection Atria. Connexion between the Intestinal Lymphatic System and the Portal Vein**].—*Dtsch. tierärztl. Wschr.* **47.** 91-93. 2 figs. [2 refs.]

Experiments on 15 dogs, 7 piglets and 2 calves showed that there is no direct connexion between the lymphatic system of the intestines and the portal vein as stated to be the case by BONGERT [(1924). *Z. Fleisch- u. Milchhyg.* **34.** 201]. The experiments were performed by rubbing a coloured liquid into the epithelium of the intestines, and by injections into the submucosa, the lymph nodes and the lymphatic vessels. Injections into the lymph nodes cannot be done without perforating blood capillaries as well, thereby nullifying the results. N. concludes that it is not yet clear how the liver and its lymph nodes become infected from an intestinal infective focus.—V. CHLÁDEK (PRAGUE).

GREENE, H. S. N., & SAXTON, J. A., Jr. (1939). **Hereditary Brachydactylia and Allied Abnormalities in the Rabbit.**—*J. exp. Med.* **69.** 301-314. 14 figs. on 2 plates, 2 tables. [6 refs.]

Genetical study of a series of deformities in the rabbit ranging from brachydactylia to acheiropodia has shown their occurrence to be determined by simple recessive hereditary factors. The deformities occur in a single genetic line and breed true. Abnormalities of the ear consisting of various localized defects appear to arise from the same fundamental variation. Embryological examination, commencing at the 16th day of foetal life, demonstrates that such abnormality is first shown by capillary dilatation and extravasation of blood in the affected parts. Necrosis and sloughing follow in a few days, and the deformity is completely demarcated by the 25th day of foetal life.—D. D. OGILVIE.

OSTERTAG, H. (1937). Ueber glandulären Hermaphroditismus beim Schwein unter besonderer Berücksichtigung des histologischen Bildes. [**Glandular Hermaphroditism in Swine and the Histological Picture**].—*Frankfurt. Z. Path.* **51.** 344-362.

An interesting anatomical and histological study of the sex organs of pigs showing varying degrees of hermaphroditism. Those interested should refer to the original article which contains a comprehensive bibliography and is well illustrated.—E. J. PULLINGER.

SALOMON, L. (1938). La glande interstitielle du testicule. Son histophysiologie générale et ses tumeurs chez les mammifères domestiques et chez l'homme. [**The Histology, Physiology and Tumours of the Interstitial Gland of the Testicle of Domestic Mammals and Man**].—*Thesis, Alfort.* pp. 306. 46 figs. [Numerous refs.]

This exhaustive monograph is largely a review of the literature dealing with

the interstitial tissue of the testis of man and animals. Most of the illustrations are reproduced from recent papers of various authors. An extensive bibliography is provided.

The first two chapters are of special interest to the veterinarian, the first dealing with the general classification of testicular tumours and the second with the author's own observations on the testes of 392 dogs 5-15 years old. Some of the cases were examined P.M. and in the remainder material was obtained at biopsy. A total of 71 animals showed testicular tumours and in 22 of these the lesions were bilateral. A variety of other pathological conditions affecting the testes are also enumerated. The majority of the tumours were classed either as seminoma or as interstitial cell tumour, in the ratio of approximately 4:3. The classification according to the size of the tumours as " tumeur " or as " nodule " makes the tables difficult to interpret.

S. was able to demonstrate by special cytological technique the presence, within the interstitial cells of the testis of the dog, and more easily in tumours arising from these cells, of cristalloids similar to those long ago recognized in the normal human testis but absent when the organ undergoes degeneration or involution.

The features which differentiate interstitial cell tumours from seminoma include the spongy nature of the cytoplasm, scarcity of glycogen, the characters of the Golgi apparatus and crystalloids, and the arrangement of the vessels.

Although the two types of tumour are usually found separately, cases were found in which both types occurred together, and it is even stated that transition of the neoplastic cells of a seminoma into those of an interstitial cell tumour can take place.—E. G. White.

Anderson, C. G., & Oag, R. K. (1939). **The Effect of Gastric Mucin on the Pathogenicity of the Meningococcus and Other Organisms : with Particular Reference to its Fractionation.**—*Brit. J. exp. Path.* **20.** 25-32. 1 table. [10 refs.]

A brief review of the literature upon the effect of gastric mucin on the infectivity for mice of gonococci, meningococci, pneumococci, *Staphylococcus aureus* and *Haemophilus influenzae* is given [see also *V. B.* **9.** 258, and 483-485].

The authors detail experiments with an autoclaved 5% mucin suspension. This was mixed in equal parts with a suspension of 18 hours' growth of two strains of meningococci on blood agar plates and injected (0·5 c.c. intraperit.) into mice. By this treatment the lethal dose of both strains was reduced to about 5% of the normal amount.

The authors describe fractionation of crude commercial mucin (aqueous solution, alkaline and acid extracts, and alcohol precipitates), the preparation of human salivary mucin, and the hydrolysis and trypsin digestion of mucin (yielding protein, carbohydrate and amino-acid fractions. Meningococci mixed with the above preparations or with numerous other substances (gums, oils, starches, adsorbents, colloids, proteins, carbohydrates and other substances) were tested on mice in the same way as the crude mucin, and the results are tabulated. Only the protein fraction of mucin activated the virulence of meningococci. Among the " other substances " agar and certain carbohydrate fractions of diphtheria bacilli alone enhanced the virulence of mucin.

Gastric mucin greatly enhanced the virulence of *Staphylococcus aureus* and certain haemolytic streptococci for mice, but did not affect *Streptococcus viridans*, *Salmonella typhi*, *Bact. coli* and *B. anthracoides* when tested in the same way.

The authors conclude that the viscosity of mucin is probably not the only factor producing these effects.—C. V. Watkins.

NUTRITION IN RELATION TO DISEASE

—. (1939). **Nutrition and the Public Health. Proceedings of a National Conference on the Wider Aspects of Nutrition, April 27-28-29, 1939.** pp. 150. 4 tables. London: British Medical Association. [8vo] [2/6].

The conference was organized by the British Medical Association with the object of drawing the attention of the public and of the government to the nutrition of the nation and to the need for a long term food policy.

Many papers were read and discussed. Professor Miller gave an outline of the field of activity of the veterinarian in relation to public health (control of animal disease, food inspection, colonial work and prevention of disease).

The following resolution was passed:–

"This Conference called by the British Medical Association and composed of representatives of medicine, agriculture at home and overseas, industry, and education, is deeply impressed with the importance of nutrition to the national welfare. It urges upon the Government the formulation of a long-term food policy in which the requirements of health, agriculture and industry shall be considered in mutual relation. It is convinced that measures to secure the more ready availability to all sections of the community of foodstuffs which are held to be desirable on nutritional grounds should be accompanied by an educational campaign to encourage their increased consumption."—J. E.

QUIN, A. H. (1939). **Some Factors Involved in the Deficiency Diseases.**—*J. Amer. vet. med. Ass.* **94.** 621-626. [13 refs.]

This article comprises a very scanty general survey of the deficiencies due to lack of inorganic mineral elements and of the vitamins. Detailed criticism is irrelevant since the article contains very little that is new. It comprises short accounts of deficiencies associated with Ca and P, NaCl, I, Fe and Cu, and Co, but it is surprising to read that the author was "not acquainted with any blood chemistry studies of grass tetany", that the disease is "probably due to a quick depletion of body Ca" and that "steamed bone flour should serve as a specific preventive". Brief accounts are given of the vitamins A, D, C, E, K, the B and B_2 complex and the "skin factor". [In many cases undue prominence is given to work which has yet to be substantiated, leaving aside established knowledge on the subject. For a general review of the various factors involved in deficiency diseases, the reader will find it more profitable to consult the standard works on the subject].—ALFRED EDEN.

AUCHTER, E. C. (1939). **The Interrelation of Soils and Plant, Animal and Human Nutrition.**—*Science.* **89.** 421-427. [4 refs.]

The need for a closely coordinated scientific attack on the problems connected with the production of food of a high nutritional quality and not merely a large quantity is stressed in this address. Some factors affecting the value of plants as food, and soil deficiencies resulting in nutritional disorders of plants, animals and human beings are briefly discussed. It is suggested that more effort should be made to correlate agricultural production with the physiological needs of animals and human beings.—R. ALLCROFT.

GREENLEE, C. W. (1939). **The Skeletal Diseases of Horses and their Relation to Nutrition.**—*Cornell Vet.* **29.** 115-124. 3 figs. [5 refs.]

Skeletal diseases are responsible for much disability in equines. While with an adequate diet minerals are stored in the skeleton, when the ration is insufficient minerals are withdrawn. Some writers consider that spavin, ringbone, sidebone, splint, arthritis and navicular disease are local manifestations of general systemic

disease (osteoporosis, osteomalacia and rickets). The author had 636 horses and mules under observation and made P.M. examinations of 134 of these. In each case there were degenerations of articular cartilages. He considered that malnutrition was the cause and fed the 502 survivors an improved ration containing alfalfa hay. After one year the number showing abnormal posture was reduced in horses from 30% to 5% and in mules from 30% to 2%. Of 234 aged horses and mules condemned to be destroyed immediately, which were reprieved owing to the impossibility of replacing them, 42·3% were still doing duty over three years later. These had received the improved ration.—J. A. GRIFFITHS.

HAMILTON, B., & HIGHMAN, W. J., Jr. (1938). **The Changes in Total Calcium Content of the Bones During the Development of Rickets.**—*J. Nutrit.* **15.** 177-186. 3 tables. [14 refs.]

It is shown that, when rickets is produced in rabbits by feeding on a rachitogenic diet, there is a loss or, at most, only a slight increase, of the total calcium content of the metatarsal bones during the period the animals are fed on the diet. The method employed was to amputate one leg before the diet was started and compare the calcium content of the bones of this leg with that of the other, removed after the end of the period of feeding. By estimating the daily amounts of calcium liberated from the metatarsal bones, the authors conclude that even if the amounts of calcium absorbed from the intestines were considerably decreased, the amounts liberated from the bones would generally be sufficient to maintain a normal concentration of calcium in the tissue fluids. [It is interesting to note that rabbits which were operated on, after being four weeks on the rachitogenic diet, succumbed to the operation more readily than animals operated on before the commencement of the experimental feeding period].—N. J. SCORGIE.

CORNER, H. H., & SMITH, A. M. (1938). **The Influence of Cobalt on Pine Disease in Sheep.**—*Biochem. J.* **32.** 1800-1805. 1 table. [18 refs.]

Analysis of the soil and herbage of various pining and non-pining farms in the Cheviot region of Scotland revealed adequate amounts of Fe, Mn and Cu and small but variable amounts of Co. Following Australasian analogies, daily drenchings of sheep with $CoCl_2$ prevented or cured the disease, and the beneficial effects from feeding crude Fe compounds are attributed to the presence of Co as impurity. 1 mg. Co per day for 14 days was effective in preventing the disease on pining land for six months, and it is concluded that pine disease in sheep is a nutritional anaemia, curable or preventable by the administration of Co.

[In view of the many misquotations of this work already appearing in the literature, it should, in fairness to the authors, be pointed out that they did not claim the disease as a Co deficiency nor do their figures necessarily show a pronounced and significant difference in the Co content of the herbage and soils between pining and non-pining farms. All that their results show and, indeed, all that they claim is that the disease is a nutritional anaemia curable by Co. It may be mentioned that the parasitological side of the disease, although very considerable and important, is not considered, and no suggestion is made about the strong possibility that the anaemia is secondary and consequent upon a heavy worm infestation].—ALFRED EDEN.

CASKEY, C. D., & NORRIS, L. C. (1939). **Relative Effectiveness of Ingested and Injected Manganese in Preventing Perosis.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 590-593. 2 tables. [9 refs.]

The results of supplying Mn in the diet of Rhode Island Red chicks for

period of six weeks showed that a level of 1·5 mg. Mn per 100 g. of a diet containing 1% Ca and 0·5% P was just as effective in preventing the development of perosis as a level of 14 mg. of Mn per 100 g. of a diet containing 3% Ca and 1·5% P. As the Mn level in either the low Ca:P diet or the high Ca:P diet was increased, the final average weight of the chicks increased and the incidence of perosis decreased.

That injected Mn was much more effective than ingested was demonstrated by the fact that the intraperitoneal injection of 10 mg. of Mn per chick during the experimental period of six weeks completely prevented the development of perosis, even though the chicks received the high Ca:P diet, whereas an oral intake of 141·7 mg. was only partially effective in the prevention of perosis. The injection of 20 and 60 mg. of Mn during the experimental period also completely prevented perosis but retarded the growth considerably. It is concluded that Ca and P when present in the diet in excess amounts greatly reduce the availability of Mn in the intestinal tract.—R. ALLCROFT.

BERNHEIM, F., & BERNHEIM, Mary L. C. (1939). **Note on the Action of Manganese and Some Other Metals [Cobalt] on the Oxidation of Certain Substances by Liver.**—*J. biol. Chem.* **128.** 79-82. 2 figs., 1 table. [2 refs.]

By measurement of the O_2 uptake in a washed liver protein-vanadium system, it was found that Mn, and to a lesser extent Co, inhibited the oxidation of phospholipide, whereas Ni, Fe, Ti and Cr were without effect. Further Mn and Co, as well as Ti, inhibited the oxidation by washed liver protein of cysteine to its sulphonic acid.—ALFRED EDEN.

GOETTSCH, Marianne, LOUSTEIN, Ida, & HUTCHINSON, J. J. (1939). **Muscle Phosphorus in Nutritional Muscular Dystrophy in Rabbits.**—*J. biol. Chem.* **128.** 9-21. 3 figs., 2 tables. [Numerous refs.]

No striking changes in the muscle phosphorus fractions were observed until the muscles were severely degenerated. Dystrophic muscles which showed histological evidence of calcification were associated with an increase in total, total acid soluble and total inorganic orthophosphate phosphorus; those without calcified fibres, with a decrease in these constituents. There was a change in the phospholipide phosphorus fraction in normal and degenerated muscles. The phosphocreatine content of resting degenerated muscles was distinctly lower than normal, but its relationship to total acid soluble phosphorus remained the same.—R. A.

MORGULIS, S. (1938). **Nutritional Muscle Dystrophy.** pp. 94. 12 text figs., 12 figs. on 3 plates, 8 tables. [Numerous refs.] Paris: Hermann & Cie. [8vo] [4s.]

This monograph deals principally with biochemical studies in connexion with muscle dystrophy arising in rabbits on diets commonly regarded as deficient in vitamin E. Details are given of biochemical and physiological alterations in the metabolism of affected animals. Experiments were undertaken to elucidate the nature of the food deficiency responsible for the muscle dystrophy, and it appears to be clearly established that several separate factors are involved. This work confirms that one of the essential factors resides in the non-saponifiable fraction of wheat-germ oil and is possibly identical with the anti-sterility factor. Another factor which is water soluble evidently belongs to the vitamin B complex, possibly B_4, but its identity still remains to be established.—N. J. SCORGIE.

GROEN, Juda. (1938). **The Absorption of Glucose from the Small Intestine in Deficiency Disease.**—*N. Engl. J. Med.* **218.** 247-253. 1 fig., 2 tables. [Numerous refs.] [Abst. from abst. in *Lancet.* **235.** 735].

G. carried out *in vivo* experiments, using the methods of MILLER and ABBOTT [(1934). *Ann. intern. Med.* **8.** 85]. The absorption value in normal individuals has been shown to be 7-9 g. of glucose. G. found that two patients with scurvy had a normal absorption value, but patients suffering from organic diseases of the intestine, such as tuberculous enteritis, had greatly decreased values. Diminished values were also found in three cases of pernicious anaemia and in one of alcoholic polyneuritis with pellagra. This was shown by the conditions of the experiment to be due to defective capacity of the intestinal wall to absorb glucose, and not to unusually rapid passage of the intestinal contents.

MACKAY, E. M., CARNE, H. O., & WICK, A. N. (1939). **Origin of Fasting Ketosis in the Rat Following a Diet Low in Choline and Protein.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 40-41. 1 table. [4 refs.]

Diets containing variable concentrations of casein, and all containing 0·5% choline hydrochloride, were fed to four groups each of 5 adult male rats for a period of ten days before fasting was commenced. The data show that the higher the protein intake preceding the fasting period the lower was the resulting ketonuria. The maximum excretion of ketone bodies in the urine occurred on the third and fourth days of fasting.—R. ALLCROFT.

I. MILLER, M. W., & BEARSE, G. E. (1938). **The Cannibalism Preventing Properties of Oat Hulls.**—*Poult. Sci.* **17.** 466-471. 1 fig., 3 tables. [2 refs.]

II. BASS, C. C. (1939). **Control of " Nose-Picking " Form of Cannibalism in Young Closely Confined Quail Fed Raw Meat.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 488-489.

I. White Leghorn pullets fed a yellow corn basal ration from the second to the thirty-second week of age developed cannibalistic habits which were prevented when this ration was supplemented with oat hulls, " oat mill feed " or replaced by an oat basal ration. Those given a supplement of " spruce dust " developed feather picking at about 14 weeks of age, but the condition practically disappeared at 32 weeks of age. Supplements of oat ash, oat hull ash or manganese sulphate failed to prevent picking.

II. A plentiful supply of raw meat given to young quail confined in brooders prevented " nose-picking ". It was sometimes necessary to withhold all other food temporarily to force the birds to eat enough raw meat to prevent this form of cannibalism. Addition of dried meat-meal, fish-meal or milk products failed to prevent the trouble.—R. ALLCROFT.

THATCHER, H. S., SURE, B., & LEE, J. (1938). **Biochemistry and Pathology of Avitaminosis. II. Histopathology of Deficiency Diseases.**—*Bull. Ark. agric. Exp. Sta.* No. 356. pp. 48. 8 figs., 17 tables. [Numerous refs.]

The results of studies on microscopic changes observed in tissues of the albino rat on diets deficient in vitamin B complex, vitamin B_1, vitamin B_2 [G] and vitamin A are presented and discussed.

The nursing young of rats on a diet deficient in vitamin B complex showed marked fatty deposition in the liver cells as well as atrophy of the spleen, haemorrhages in bone tissues and anhydraemia. Similar animals suffering from vitamin B_1 deficiency had a marked reduction in the glycogen content of the liver and

atrophy of the spleen as well as hypoglycaemia and anhydraemia, but no noteworthy fatty changes were seen in the liver.

The pathological changes observed in weaned rats deprived of the vitamin B complex were mainly those associated with inanition, although fatty infiltration of the liver cells was noted in a few cases. Atrophy of the spleen and hypertrophy of the adrenal glands and heart were the changes noted in weaned animals suffering from vitamin B_1 deficiency uncomplicated by inanition. Another significant result of specific vitamin B_1 deficiency was the production of gastric ulcers in some of the animals.

Microscopic examination of nerves from rats deficient in both vitamin B_1 and the vitamin B complex showed varying degrees of myelin degeneration, and in the later stages of the deficiency the axis cylinders were broken but no notable changes were observed in the C.N.S.

The main symptoms of vitamin B_2 [G] deficiency were cessation of growth, loss of weight and dermatitis; a seasonal variation was noted in the occurrence of the dermatitis. Since no correlation was found between loss of body weight and the onset of skin lesions, it was concluded that the anti-dermatitic and growth-promoting syndromes are not identical.

Pathological changes due to vitamin B_2 [G] deficiency were alopecia, ulceration of the skin, atrophy of the spleen and thymus, fatty changes of the liver and haemorrhages and congestion of the intestines.

Histological examination of tissues from rats on a diet deficient in vitamin A showed that metaplastic changes occurred in the posterior part of the tongue, in the salivary glands and in the respiratory and urinary tracts during the early stages of the deficiency and in a large proportion of animals with normal growth, some of which showed no external signs of A avitaminosis.—R. ALLCROFT.

PATTON, J. W. (1939). **Fright Disease an Avitaminosis.**—*Vet. Med.* **34.** 372-381. 3 figs. [Numerous refs.]

Symptoms of fright disease (canine hysteria) were produced in dogs by feeding them on a diet deficient in vitamin B_1. In the first series of experiments seven adult dogs were fed on a commercial dog food which had been the diet of certain dogs that had contracted the disease, whilst in the second series six five-month-old puppies were fed on the same food after it had been autoclaved for 2 hours to destroy any vitamin B_1 present. All the experimental dogs received supplements of vitamins A, D and B_2 [G]. In the first series, anorexia, the classical first sign of B_1 deficiency, was noted in about 10 days, and within the next 72 hours all the dogs showed the characteristic nervous symptoms of fright disease. In the second series of dogs similar symptoms were manifested in less than half the time required in the first series. This is explained by the fact that the animals in the second series were young growing dogs and had therefore higher vitamin B_1 requirements; in addition these dogs were completely deprived of vitamin B_1 by autoclaving the food, while the older dogs possibly received some B_1 in the food, although an inadequate amount. The symptoms produced were more uniform in the second series, but in both cases they were considered to be those of pure vitamin B_1 deficiency without complications.

Further support to the thesis that absence of vitamin B_1 was the critical factor is given by the fact that after hypodermic injection of thiamin hydrochloride (vitamin B_1) the dogs made spectacular recoveries. As a result of this finding, the treatment recommended for affected animals is the injection of 500 I.U. of thiamin hydrochloride (for young dogs weighing about 12 lbs.) daily for two or three days and a change to a diet adequate in vitamin B_1. It was found that whilst 250 I.U. of

thiamin once daily ameliorated the symptoms it was insufficient for a cure in well-developed cases. In a general discussion P. stresses that fright disease is not new, and that its greater prevalence in recent years is probably accounted for by the more artificial types of food now commonly employed for dog feeding.—N. J. S.

BAUERNFEIND, J. C., & NORRIS, L. C. (1939). **The Antidermatosis Vitamin Required for Reproduction in the Domestic Fowl.**—*Science.* **89.** 416-417. 1 table. [5 refs.]

Four groups of hens were fed the following diets respectively :– (1) a normal diet containing all the vitamins known to be required by the domestic fowl ; (2) the same diet, except that the cereal portion and the liver extract were heated to destroy the antidermatosis vitamin—this was designated the heated diet ; (3) the heated diet + 5% whey adsorbate which contained the new growth and reproduction vitamin [see *V. B.* **9.** 257.], and (4) the heated diet + 5% whey adsorbate + 5% antidermatosis vitamin. The results showed that the average hatchability of the eggs of the hens fed the normal diet was 60% while that of the eggs of the hens fed the heated diet was 2·8%. No improvement in hatchability was obtained by addition of the whey adsorbate only to the heated diet, but the hatchability increased rapidly to 48% when 5% antidermatosis vitamin concentrate was also added. Observations on the development of dermatosis in chicks from the eggs of the hens in groups (1) and (2) showed that the eggs of hens fed the heated diet contained less of the antidermatosis vitamin than those of the hens fed the normal diet.

From the results it is concluded that the antidermatosis vitamin is required for hatchability or reproduction in the domestic fowl, but a lack of this vitamin did not affect egg production or mortality during the experimental period.—R. A.

DANN, W. J. (1938). **Animal Deficiency Diseases Related to Pellagra.**—*J. Amer. diet. Ass.* **14.** 157-167. [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 740. Signed D. C. H.]

A history of the unravelling of the vitamin B complex is given, the only part suitable for summary being the statement of the present position regarding vitamins B_1 and B_2 :– B_1 is the anti-neuritic factor. [Its constitution is known and it can be synthesized]. B_2 consists of—(a) Lactoflavin, essential to growth in rats and chicks, prevents dermatitis in turkey poults, cataract in rats and " yellow liver " in dogs. [Constitution known and can be synthesized]. (b) Nicotinic acid, cures human pellagra and blacktongue in dogs. [Constitution known and can be synthesized]. (c) The rat pellagra-preventing factor. (d) The chick pellagra-preventing factor, also essential for rat growth.

MORRIS, M. L., & FRANKLIN, C. E. (1939). **A Preliminary Report on the Use of Nicotinic Acid in the Treatment of Fuso-Spirochetal Disease of Dogs.** —*N. Amer. Vet.* **20.** No. 6. 31-33. [8 refs.]

Administration of 20-50 mg. of nicotinic acid thrice weekly for a period of two weeks to dogs suffering from oral fuso-spirochaetal disease (Vincent's angina) greatly reduced the number of fusiform bacilli, cocci, and vibrios in the previously infected areas. Investigations showed that in some cases the fuso-spirochaetal infection was transmitted from man to the dog.—R. ALLCROFT.

UNNA, K. (1939). **Studies on the Toxicity and Pharmacology of Nicotinic Acid.** —*J. Pharmacol.* **65.** 95-103. 3 figs. [Numerous refs.]

Experimental evidence is presented demonstrating that prolonged oral administration of large amounts of sodium nicotinate (up to 2 g. per kg. body weight daily)

to chickens, rats and dogs over periods up to two months, failed to produce toxic symptoms or pathological changes of the organs. Acute toxicity of nicotinic acid in mice and rats ranged from 4-5 g. per kg. body weight after subcutaneous and from 5-7 g. per kg. body weight after oral administration. Nicotinic amide was found to be about twice as toxic.

The metabolism and the circulatory and respiratory systems of normal animals were not influenced by sodium nicotinate and nicotinic amide.—R. ALLCROFT.

DAY, P. L., DARBY, W. J., & COSGROVE, K. W. (1938). **The Arrest of Nutritional Cataract by the Use of Riboflavin.**—*J. Nutrit.* **15.** 83-90. 2 figs., 1 table. [4 refs.]

Young rats given a diet deficient in flavin developed nutritional cataract after an average interval of 52 days, the lesions reaching maturity in about a further 15 days. Intramuscular injections of riboflavin in doses of 120 γ twice weekly were found to arrest the development of the cataract in 89·5% of cases if given in the early stages of the lesion. The authors conclude that their experiments furnish evidence that flavin is the cataract-preventing factor. [The type of cataract here described differs from that produced by lactose or galactose feeding].—N. J. S.

PUBLIC HEALTH

—. (1938). Loi sur la production du lait alimentaire. [**Portugal: Law for the Production of Milk**].—*Bol. pec., Lisboa.* **6.** 67-83. [In French].

Three designations of milk are recognized in Portugal:—(1) ordinary milk, *i.e.* milk produced from healthy cows and satisfying certain conditions relating to fat content, absence of colouring matter and pathogenic organisms, etc.; (2) pasteurized milk, *i.e.*, milk which after pasteurization satisfies the requirements relating to ordinary milk, and (3) special raw milk, *i.e.* milk which besides satisfying the requirements relating to ordinary milk, is produced under certain conditions specified by law. Cows intended for the production of milk in this last category must be previously approved and receive permanent veterinary attention. They must be housed away from densely populated areas, and there must be separate accommodation for milking. A cold storage room must be provided where milk may be kept at a temperature not exceeding 7°C., and the temperature during the sale and distribution of this milk must not exceed this figure. A sample of the milk produced each day is required to be kept for 24 hours. The personnel of the establishment must be healthy and be subject to regular medical attention.

All producers of milk must be licensed by the Municipal Veterinary Officer in accordance with instructions laid down by the Director General of Veterinary Services. Byres must conform with regulations regarding accommodation and structure. Cows whose milk appears constantly unfit for human consumption may not be used for milk production and, if not slaughtered, must be branded. Pasteurization centres are to be established throughout the country and at some future date the sale of unpasteurized milk, except the special raw milk, will be forbidden.—H. V. HUGHES.

FUCHS, A. W., & FRANK, L. C. (1938). **Milk Supplies and their Control in American Urban Communities of over 1,000 Population in 1936.**—*Publ. Hlth. Bull., Wash.* No. 245. pp. 69. 1 fig., 59 tables.

Data received in answer to questionnaires concerning the milk supplies and

their control are tabulated. Particulars are given of production, processing, consumption of milk, prices of the various grades, legal safeguards and the inspectorate employed.

Pasteurization was carried out in two thirds of the towns, its use increasing with expanding populations. In the larger towns, whilst tuberculin testing remained constant, testing for brucella infection decreased.

"Since 1923 progress in abortion testing has been phenomenal, in tuberculin testing extensive, particularly in the larger cities, and in pasteurization considerable, especially in the smaller municipalities. There is some reason to believe the abortion testing figures are too high."

99·4% of the entire milk supply was from tuberculin tested herds; 74·7% pasteurized; 74·1% both tuberculin tested and pasteurized; 35·2% from abortion free herds; 35% from both tuberculin tested and abortion free herds; 20·5% from abortion free herds and also pasteurized; whilst 20·3% of the entire milk supply was tuberculin tested, abortion free and pasteurized.—H. E. Bywater.

Mello, A., & Mastrofrancisco, N. (1938). Verificaçoes sobre a presença do bacilo tuberculoso no leite da Capital. [**Detection of Tubercle Bacilli in Market Milk of São Paulo**].—*Rev. Industr. anim.* **1.** No. 4. 25-42. 8 figs., 1 plate. [13 refs.] [English summary].

30 out of 100 samples taken at random from milk exposed for sale in São Paulo contained *Mycobact. tuberculosis.*

The authors note that the existing legislation, were it effective, would be sufficient to put a stop to such an insanitary state of affairs.—J. Pasfield.

Bohn, J. D. (1939). **The Use and Value of the Phosphatase Test for Control of Pasteurization.**—*J. Amer. vet. med. Ass.* **94.** 376-377.

The Scharer modification of the phosphatase test is simple and inexpensive and can be adopted for use in the field, thus making it possible to test before the milk is bottled. Field tests have a high educational value to the dairyman. The test can be used with slight modifications for butter, cheese, ice cream, etc.

The laboratory test takes one hour and will detect the presence of 0·1-0·01% of raw milk, whilst the field test can be completed in less than twenty minutes, and is capable of demonstrating the presence of 0·5% of raw milk. Details of the two tests are given.—H. E. Bywater.

Shaughnessy, H. J., & Grubb, T. C. (1937). **The Incrimination of Milk and Milk Products in Staphylococcus Poisoning. Suggested Methods for the Investigation of Outbreaks.**—*Canad. publ. Hlth J.* **28.** 229-234. [14 refs.]

All outbreaks of milk-borne staphylococcal food poisoning investigated by the authors originated from small herds supplying milk to small communities. In all instances cows with staphylococcal mastitis were found. The affected milk had a normal appearance and taste. Outbreaks did occur from supplies to large cities, probably due to bulking of milk and consequent dilution of the enterotoxin, which is relatively stable to heat and not destroyed by pasteurization.

Symptoms usually appeared 2-4 hours after consumption of affected milk, and this fact helps to distinguish staphylococcal from salmonella food poisoning, since in the latter the symptoms generally appear not less than 6 hours, and often as late as 24-48 hours, after ingestion. An individual immunity or tolerance to the toxin is not uncommon.

The authors state that the most reliable method of detecting food poisoning strains of staphylococci is to culture the organisms, under conditions favourable

to the development of the enterotoxin, and then to feed sterile filtrates to human volunteers with due precaution.—H. E. Bywater.

von Ostertag, R. (1938). Neuzeitliche Fragen der Fleischbeschau. [**Modern Problems of Meat Inspection**].—*Z. Fleisch-u. Milchhyg.* **49.** 1-6, 21-23, 66-67, 81-82, and 101-103. [Numerous refs.]

A comment on recent German regulations concerning meat inspection is followed by a detailed discussion of problems still unsolved. Although the eradication of cysticercosis in swine has been very successful, cysticercosis in cattle is more frequent than ever before. The detection of *Taenia* carriers in man should be improved by premiums for every whole *Taenia* delivered, and it should be obligatory for treatment to be under medical supervision, ensuring that the parasites and their eggs are effectively destroyed. The number of *Taenia* carriers is appalling. Meadows and pastures should not be manured with human faeces. [It is not suggested that the custom of eating raw meat should be abandoned]. Echinococcosis has decreased in cattle and swine, but has increased in sheep. The inspection of sheep slaughtered on the farm and the periodical treatment of sheep dogs may lead to a decrease in the incidence of echinococcosis. Similar measures may lead to a complete disappearance of coenurosis.

Trichinosis in foxes seems to be more common than in swine; mice are a possible source of infection. Great losses are caused by confiscation of the meat of cryptorchid pigs because of the odour. All cryptorchids should undergo castration before the age of four months; eleven days after castration the meat will be odourless, but the odour takes ten weeks to disappear from the fat. The finding of vertebral tuberculosis in pigs makes an inspection of other bones necessary, and TB. of one bone justifies a degradation of the meat quality. The tonsils of cattle and swine should always be inspected, but without making incisions, and removed as unfit for food. Attention is called to the spreading of *Brucella melitensis* infection in the eastern part of France.—V. Chládek (Prague).

Maternowska, I. (1937). Działanie prądu elektrycznego na poszczególne komórki i tkanki zwierząt rzeźnych. [**Action of Electric Current on Particular Cells and on the Tissue of Slaughter Animals**].—*Hig. Prod. Zwier.* **2.** 73-85. 6 figs. [3 refs.] [Suppl. to *Wiad. weteryn.* **16.**]

M. first observed the effect of the different types of current on particular cells. They affected not only the surface of the cells, but also the plasma. Alternating current had a more marked effect on plasma than direct current or intermittent direct current. The organs of electrically-stunned animals gave a more acid reaction than those of animals slaughtered without stunning. Unconsciousness lasted for 2-5 minutes after the cessation of the current. Nowadays alternating current is generally used. The following were found suitable in stunning:– for pigs, 70-80 volts, 0·5 amps, and 3,000-4,000 cycles per minute, for 20-30 seconds; for calves, 45 volts, 0·5 amps, and 3,000-4,000 cycles per minute, for 15-20 seconds; and for adult cattle, 20-60 volts, 0·5 amps, and 4,000-5,000 cycles per minute, for 15-30 seconds. Bleeding was more complete in animals killed after electrical stunning than in others not so stunned. The current used must be appropriate for the species; if the current is too heavy there may be "splashes" on the mucous and serous membranes. Hyperaemia of the spleen is sometimes found after electric stunning, which may lead to anthrax being suspected.—V. Chládek (Prague).

Schoop, G., & Lorenzen, P. (1938). Anaerobier in der bakteriologischen Fleischbeschau. [**Anaerobes in Bacteriological Meat Inspection**].—*Dtsch. tierärztl. Wschr.* **46.** 209-215. 4 tables. [10 refs.]

According to German regulations pieces of muscle, spleen, kidney or liver from

suspected carcasses are put into dextrose agar or liver-broth media, the presence of anaerobes being judged by the gas formation. The authors investigated carcasses in this way, and in addition differentiated the organisms by Fortner's method. 779 carcasses were examined and 213 cultures of anaerobes were isolated. Other observations were made to determine the seat of infection, the extent of infection in slaughter animals and the influence of temperature on the organisms. In descending order of frequency, anaerobes were found in the liver, kidney, spleen and muscles.

Sheep are the most frequently affected, then cattle, calves, horses and pigs. Most of the anaerobic infections were found during July and August.

The anaerobes found are divided into three groups. Pathogenic types were present in 94 out of 213 cases, in which anaerobes found were *Clostridium welchii* in 64 cases, *Cl. septique* in 21, and *Cl. oedematiens* in 9.

In 119 cases the anaerobes were non-pathogenic. Putrefactive non-pathogenic strain represented by *Cl. sporogenes* and *Cl. bifermentans* were present in 24% of cases in which anaerobes were present. Non-pathogenic, non-putrefactive anaerobes were found in 31% of cases (*Cl. amylobacter*, *Cl. sphenoides*, *Cl. multifermentans*, *Cl. tetanomorphus* and *Cl. lichenoides*).

Anaerobes were found mostly in carcasses in which there was disease of the genital tract of cattle and digestive tract of sheep, but sometimes also in those of cattle in which there was traumatic peritonitis and pericarditis.

The authors suggest that when pathogenic anaerobes are present the carcass is unfit for consumption and should be condemned. The putrefactive non-pathogenic anaerobes produce putrefaction and green discolouration of the tissues, and a foul odour, and the keeping quality of the meat is impaired; meat infected with such organisms should be condemned. Non-putrefactive, non-pathogenic anaerobes are the least dangerous, and in this case only the affected part of the carcass should be condemned.—M. F. Benjamin.

Boss, H. (1938). Untersuchungen über die unspezifische Agglutination (Spontanagglutination) bei Bakterien der Intermedius-Gruppe mit besonderer Berücksichtigung der Agglutination auf dem Objektträger (Probeagglutination) bei der bakteriologischen Fleischbeschau. [**Non-Specific Agglutination of Bacteria of the Intermediate Group (Coli-Salmonella) with Reference to the Rapid Agglutination Test in Meat Inspection**].—*Inaug. Diss.*, *Giessen.* pp. 56. 17 tables. [Numerous refs.]

In the routine examination of meat for food-poisoning bacteria of the salmonella group there are often found organisms which are intermediate between the salmonella and the *coli* groups. These bacteria give colonies on the differential media similar to those of the salmonella group; and when isolated they usually fail to ferment lactose, but differ from the salmonella group by fermentation of saccharose or the production of indol. [These bacteria often ferment lactose at a later date if incubated for a long time and are often spoken of as " late lactose fermenters "]. Such bacteria often show some agglutination by salmonella sera, especially if a slide method (*Objektträger*) is adopted.

B. has shown that salmonella bacteria, " intermediates " and *Bact. coli* are agglutinated by the slide technique and to low titres by the usual method, by normal horse serum, by a sample of swine erysipelas serum and a sample of anthrax serum, and to a much less extent by normal rabbit serum. [This is generally speaking in accordance with the distribution of normal agglutinins]. There were similar cross-agglutinations, all to very low titres, between salmonella bacteria and immune sera having no definite serological relationships. Ten strains of intermediate bacteria were isolated from meat in the routine examination and all strains were

studied by cultural and serological means. Nine strains were only agglutinated by salmonella sera to the low titres referred to ; the other strain was agglutinated to high titres by a mixed *S. paratyphi-B* and by a mixed *S. typhi-murium* serum. These titres were obtained with suspensions containing " H " antigens.

It is pointed out that the titres obtaining with the intermediate group of bacteria are usually low, and that when reactions occur with the rapid method it may be necessary to defer judgement till they are tested by the tube method. The agglutinations are in the cases cited non-specific, for similar reactions are obtained with sera prepared against the swine erysipelas bacillus and the anthrax bacillus.

—R. Lovell.

I. de Koning, K. (1936). Salmonellose der eend als oorzaak van voedselvergiftiging (consumptie-ijs) bij den mensch. [**Salmonella Infection in Ducks as the Cause of Food Poisoning in Man**].—*Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **3.** 238-240.

II. Jansen, J. (1936). Salmonellose der eend als oorzaak van voedselvergiftiging (consumptie-ijs) bij den mensch. [**Salmonella Infection in Ducks as Cause of Food Poisoning in Man**].—*Ibid.* 241-243.

I. Investigations in an instance of food poisoning involving some 60 persons after eating ice-cream in 1936 are claimed to have shown that raw ducks' eggs coming from a neighbouring farm had been used in the preparation of the ice-cream. Of the 25 laying ducks on that farm, 22 reacted positively to the agglutination test with *Salmonella typhi-murium*, and also an organism which was cultured from the yolk of their eggs was agglutinated by *S. typhi-murium* antiserum. A paratyphoid organism of the *typhi-murium* type was isolated from the faeces of the patients.

II. Bacteriological studies of the bacillus isolated by de Koning from ducks' eggs [see I] are stated to have shown that it is a strain of *Salmonella typhi-murium* which does not ferment rhamnose. All the ducks on the infected farm were killed, and on autopsy many of them were found to be affected with oophoritis typical of salmonella infection, and isolations from their ovaries yielded an organism identical in all its characteristics with that found in the egg.

THERAPEUTICS

I. Finkelstein, R., & Birkeland, J. M. (1938). **The Mode of Action of Sulfanilamide and Prontosil.**—*Science.* **87.** 441-442. 1 table. [4 refs.]

II. Maegraith, B. G., & Vollum, R. L. (1938). **The Bacteriostatic Effects of Sulphonamide-P, Soluseptasine, and M & B 693.**—*Brit. med. J.* Nov. 12th. 985-986. 3 tables. [5 refs.]

III. White, H. J., & Parker, J. M. (1938). **The Bactericidal Effect of Sulfanilamide Upon Beta Hemolytic Streptococci in Vitro.**—*J. Bact.* **36.** 481-498. 5 tables, 4 charts. [17 refs.]

IV. Green, D. F., Allison, J. B., & Morris, M. L. (1938). **The Renal Excretion of Sulfanilamide in Dogs.**—*J. Pharmacol.* **64.** 263-270. 3 figs., 1 table. [9 refs.]

V. Labelle, G. (1938). **Sulfanilamide in Veterinary Therapeutics.**—*Vet. Med.* **33.** 488-489.

VI. Pade, H. (1938). Prontosil in der Veterinärmedizin. [**Use of Prontosil in Veterinary Medicine**].—*Vet. med. Nachr.* Nos. 4 & 5. pp. 89-100. [19 refs.]

I. Various dilutions of sulphanilamide or of prontosil were added to agglutination tubes containing suspensions of streptococci and g. pig's leucocytes mixed

with plasma ; the mixtures were incubated for 30 minutes, then smears were made and examined. The greatest degree of phagocytosis occurred in the tubes containing dilutions of sulphanilamide and of prontosil between 1:50,000 and 1:100,000; the percentage of cells taking part in the reaction showed a marked increase over that of the controls. Evidence was obtained that serum, or a factor in it, is necessary to obtain this effect of the drugs. OSGOOD [(1938). *J. Amer. Med. Ass.* **110.** 349.] has recently obtained similar results and concludes that increased phagocytosis is due to a neutralization of the bacterial toxins by the drug, which has no direct action on either the leucocytes or the bacteria.

II. All these drugs inhibit the growth of *Streptococcus viridans*, M & B 693 being the most effective. They are all ineffective in the absence of leucocytes. Soluseptasine inhibits the growth of *Neisseria gonorrhoeae* in the absence of leucocytes. All the drugs are effective against *N. meningitidis*; M & B 693 is the most effective and is active even in the absence of blood. It is suggested that M & B 693 may prove the most useful therapeutic agent in cerebrospinal fever, and in conditions arising from infections with *Str. viridans*, while soluseptasine seems the most satisfactory for dealing with *N. gonorrhoeae*.

III. Bactericidal action upon 36 strains of beta-haemolytic streptococci recently isolated from human infections has been demonstrated with 20 mg. % sulphanilamide *in vitro* at 40°C. in peptone-glucose broth and in whole blood. This streptococcicidal action can also be demonstrated *in vitro* with lower concentrations of sulphanilamide. Bactericidal action due to sulphanilamide could not be demonstrated at test temperatures lower than 39°C. Experimental evidence indicates that the action of sulphanilamide *in vitro* is delayed for at least three hours.

IV. The sulphanilamide clearance was found to be about 36% of the urea clearance and 20% of the creatinine clearance in a dog with normal renal function. The sulphanilamide clearance is lowered when the urea clearance is reduced by kidney damage, but the sulphanilamide-urea clearance ratio tends to increase when there is any lowering in the urea clearance. It is suggested that this ratio may be used to indicate kidney damage, as well as to give more information concerning kidney function. Dosage should be based upon maintenance of the blood sulphanilamide level rather than upon body weight.

V. Sulphanilamide cured 95% of cases of polyarthritis, septicaemia and omphalophlebitis in new-born foals. The dosage should start at 5 g. on the first day, decreasing to 1 g. on the fifth day; the drug is administered with an equal quantity of sodium bicarbonate in mare's milk. In large animals the dosage starts at 40 g. per day, decreasing to 8 g. on the fifth day. It is stated that encouraging results were obtained in cases of glanders, influenza, mastitis, traumata, arthritis, septicaemia following surgical intervention, metritis, pneumonia, white scour of calves, etc. [No details are given and bare statements concerning cures of certain affections must be read with reserve.]

VI. The use of prontosil in infectious catarrh and infectious angina of the horse is said to prevent secondary infections ; in strangles the drug is said to prevent streptococcal complications. Satisfactory results have been obtained in the treatment of petechial fever. In dogs and cats the drug has been used in the treatment of vaginitis, endometritis, infections of the respiratory and gastro-intestinal tracts, and infected wounds. The dose is 0·75-8 c.c. of a 5% solution given daily intramuscularly. No satisfactory results have been obtained in the treatment of pyogenic mastitis. Good results were said to have been obtained in the treatment of bovine broncho-pneumonia. Treatment with prontosil is said to produce improvement in *Bact. coli* and *Streptococcus pyogenes* infections, and in puerperal fever in cattle.—J. M. ROBSON.

I. McIntosh, J., & Whitby, L. E. H. (1939). **The Mode of Action of Drugs of the Sulphonamide Group.**—*Lancet.* **236.** 431-435. 5 tables. [10 refs.]

II. Tunnicliff, Ruth. (1939). **The Action of Prontosil-Soluble and Sulfanilamide on the Phagocytic Activity of Leukocytes and on the Dissociation of Streptococci.**—*J. infect. Dis.* **64.** 59-65. 2 figs., 1 table. [13 refs.]

I. Sulphonamide drugs do not stimulate leucocytic or phagocytic activity. They do not affect the speed of production, or the quantity or quality of specific immune bodies. Both *in vitro* and *in vivo* the drugs are not instantly active, and there is a lag of several hours before their effects develop. There is a quantitative relationship between the effective dose of the drug and the number of bacteria affected. Sulphonamide drugs are active on highly virulent organisms and on those in the logarithmic phase of multiplication; they are inactive on "rough" organisms. The drugs are not simple germicides; they probably act by neutralization of some metabolic function or enzymic activity.

II. Prontosil-soluble diluted from 1:1,000-1:1,000,000 and sulphanilamide diluted 1:100,000-1:2,000,000 in salt solution promote phagocytosis of *viridans* type and haemolytic streptococci. Both preparations appear to stimulate the activity of leucocytes but they do not act as opsonin. A 1:1,000 solution of prontosil-soluble and a 1:1,000,000 solution of sulphanilamide promote phagocytosis of streptococci in pus. Both prontosil-soluble and sulphanilamide injected subcutaneously into mice in amounts which give approximately the same blood levels of free sulphanilamide appear to stimulate the activity of leucocytes to the same degree.—J. M. Robson.

I. Delidimitriou, G. (1938). Note sur le traitement de la trypanosomiase à congolense par le surfen C. Bayer. [**Treatment of** *Trypanosoma congolense* **Infection in Cattle with Surfen C**].—*Ann. Soc. belge Méd. trop.* **18.** 539-542. 1 table.

II. van Saceghem, R. (1938). Note sur le traitement des trypanosomiases par le Surfen C chez les bovidés. [**Treatment of Bovine Trypanosomiasis with Surfen C**].—*Ibid.* 699-703. [4 refs.]

I. D. treated 270 bovine cases of *Tryp. congolense* infection with a single intramuscular injection of 100 c.c. of 2·5% Surfen C, and on examining blood smears one to six months later saw trypanosomes in only 28. The drug is therefore very efficacious. It does not begin to act for one or two days after injection. The subcutaneous route was tried without untoward results in two cattle, but the intravenous route is dangerous.

II. The author has had experience similar to D.'s and comes to the same conclusions. He states further that Surfen C is effective also against *Tryp. vivax.* —J. E.

I. van den Branden, F. (1938). Étude de l'action des vapeurs de "Bayer" 205 sur le rat blanc infecté de trypanosome "Brucei". [**Action of Fumes of Bayer 205 on White Rats Infected with** *Tryp. brucei*].—*Ann. Soc. belge Méd. trop.* **18.** 515-522. [2 refs.]

II. van den Branden, F. Recherche sur l'action de l'astreptine Meurice (P-aminophénol-sulfonamide) sur le Trypanosoma "brucei". [**Action of Astreptin (Sulphanilamide) on** *Tryp. brucei*].—*Ibid.* 693-694.

III. van den Branden, F. (1938). Le sulfate d'ortho-oxy-quinoléine (chinosol-sunoxol) a-t-il une action in vivo sur des rats blancs infectés de Trypanosoma "brucei"? [**Action** *in vivo* **of Sulphate of Ortho-oxyquinoline (Chinosol-Sunoxol) on White Rats Infected with** *Tryp. brucei*].—*Ibid.* 695-698. [1 ref.]

I. Rats infected with *Tryp. brucei* and placed immediately in a glass jar into

which a vapour of " Bayer 205 " was forced did not develop infection, but it was not possible to cure by this means rats already infected.

II. Tests on five infected rats with one to three doses of astreptine (10-30 cg.) showed that it has no trypanocidal action on *Tryp. brucei.*

III. This drug was also found inactive against *Tryp. brucei* infection in white rats, though it had some action *in vitro*.—J. E.

VIERTHALER, R. W., & BOSELLI, A. (1939). Die Bedeutung kleinster Germaninmengen im Kaninchenblut als Schutz gegen eine Infektion mit Trypanosoma brucei. [**Value of Very Small Amounts of Germanin in Rabbit Blood as Protection Against an Infection with** *Tryp. brucei*].—*Arch. Schiffs- u. Tropenhyg.* **43.** 149-160. 5 figs., 11 tables. [7 refs.]

The first part of the paper deals with the technique of estimating germanin in blood, the method of DANGERFIELD, GAUNT and WORMALL [(1938) *Biol. J.* **32.** 59.] being used. The smallest protective blood concentration of the drug which would protect rabbits against a single injection of a highly virulent strain of *Tryp. brucei* was then determined by experiments with graded doses. It was found that a concentration of 1·3 mg. per 100 c.c. of blood was effective.—J. E.

I. VAN DEN BRANDEN, F., & POTTIER, R. (1938). Essais de perfectionnement du contrôle biologique des glyphénarsines (Tryparsamide, Tryponarsyl, Novatoxyl, Trypothane). [**Attempts to Improve the Biological Control of Glyphenarsins**].—*Ann. Soc. belge Méd. trop.* **18.** 299-311. 1 fig., 5 tables. [11 refs.]

II. VAN DEN BRANDEN, F. (1938). Over de biologische proef van " Bayer " 205 of Germanine en gelijksoortige produkten : 309 " Fourneau " of Moranyl en Belganyl. [**Biological Tests of Bayer 205**].—*Ibid.* 687-692. [In Dutch : French summary].

I. The authors propose the following method of biological standardization (standardization of toxicity) of the drugs named. (1) *Rabbit test.* Five similar rabbits of 1,750-2,250 g. to be given, after 15 days' careful observation, 1 g. per kg. body weight, diluted 1:10 in distilled water sterilized by boiling, and slowly injected warm into the ear vein: not more than two of the rabbits ought to die within seven days. (2) *White mouse test.* Ten white mice of 20 g. to be injected subcutaneously with 0·09 g. of the drug (diluted and sterilized as above): six mice ought to survive beyond ten days and not more than four ought to suffer " crises nerveuses ".

II. The author suggests the following biological method for the standardization of naganol. (1) *Toxicity test.* Eight white mice of 20 g. to be given subcut. 1·5 cg. of the drug in 1 c.c. of physiological saline : six out of eight of the mice should survive over 15 days. (2) *Therapeutic test.* Eight white mice of 20 g., infected by *Trypanosoma brucei* (Congo strain) to be given 0·1 mg. of naganol in 1 c.c. of physiological saline 24 or 36 hours later : six of the eight animals ought to be cured and free from infection by the 20th day.—J. E.

ENDREJAT, E. (1939). Die Beschalseuche und ihre Behändlung. [**Dourine and Its Treatment**].—*Dtsch. tierärztl. Wschr.* **47.** 261-263.

After a brief review of dourine as it occurs in Iran, E. gives histories of 13 cases treated with naganol. Good results are claimed even for cases in which emaciation and paralysis were already marked. Eleven cases appeared to recover completely, but had not been observed long enough to preclude the possibility of relapse. [No facilities existed for conducting serological tests—see *V. B.* **5.** 803].

Laminitis was often a complication of repeated dosage with naganol; where this occurred antimosan was substituted for naganol until the laminitis was cured, when naganol was again used. The initial intravenous dose of 4-5 g. of naganol usually produced a marked reaction. Subsequent doses were of 2-4 g. at intervals of a few days to a week or so, depending on the condition of the patient. A total of 11 g. was usually necessary; 17 g. were used in one case.

The method is proving useful in a country where control by veterinary police measures are impracticable.—H. E. HARBOUR.

LAUNOY, L., & LAGODSKY, H. (1938). Étude de la stibio-résistance, secondaire à l'arséno-résistance, acquise par Trypanosoma annamense. [**Resistance of *Tryp. annamense* to Antimony Secondary to Resistance to Arsenic**].—*Bull. Soc. Path. exot.* **31.** 866-876. 6 tables. [7 refs.]

The authors found that *Tryp. annamense* developed resistance to antimony compounds when infected rabbits were treated with tryparsamide; this was also the case when the mouse was the host.—M. L. BINGHAM.

WIRTH, D., & LANGER, H. (1937). Atoxyl bei Geflügelspirochätose. [**Treatment of Fowl Spirochaetosis with Atoxyl**].—*Wien. tierärztl. Mschr.* **24.** 203-205. [4 refs.]

Among fowls affected with spirochaetosis, there was a mortality of 50% after treatment with atoxyl in doses of 0·05 g. per kg. body weight of a freshly prepared solution given intramuscularly. P.M. there was severe visceral gout in all cases. Experiments with fowls affected experimentally with visceral gout confirmed the suspicion that atoxyl is contra-indicated in cases of this disease because its administration is followed by a severe intoxication.—V. CHLÁDEK (PRAGUE).

MACLEOD, J. (1938). **On the Protection of Sheep from Maggot-Fly.**—*Bull. ent. Res.* **29.** 149-163. 1 fig., 7 tables. [6 refs.]

The chemical protection of sheep against maggot flies may be achieved in various ways and this subject is considered in detail. Owing to a number of difficulties, the normal type of field trial is regarded as unsatisfactory for the testing of protective dips and sprays. Experimental methods are described for assessing the repellent, ovicidal and larvicidal properties of chemicals and the duration of their effect in the fleece. The limitations of these tests are discussed and it is suggested that they should be supplemented by large scale field tests under natural conditions. The results obtained with certain proprietary dips are described. Carbolic dips neither repel the fly nor prevent the establishment of artificial strike on the skin; cresylic acid, incorporated in a mineral oil base, proved ineffective in these respects. Arsenic dips protect sheep against artificial strike for about four weeks under winter conditions. Soluble arsenic persists in the fleece and appears to be only slightly affected by heavy rain, since a dip consisting entirely of soluble arsenic gave good protection during rainy weather.—R. P. H.

BAUDET, E. A. R. F. (1937). Over het gebruik van demalen lonchocarpuswortel bij de runderhorzelbestrijding. [**Lonchocarpus Root Powder as an Ox Warble Larvicide**].—*Tijdschr. Diergeneesk.* **64.** 1033-1037. [English, French and German summaries].

B. found that a wash prepared with one part powdered *Lonchocarpus* root in thirty parts water was slightly less effective in destroying the larvae of the ox-warble fly infesting calves than a derris powder wash of the same concentration. It is stated that it is easier to assess the quality of derris than of the *Lonchocarpus* root.

SANNIER, A. (1937). Contribution à l'étude du pouvoir acaricide des crésols. [**Acaricidal Power of Cresols**].—*Thesis, Alfort.* pp. 98. 24 tables. [Numerous refs.]

Details are given of experiments in which, of all the preparations tested, including arsenicals and mercurials, cresols appeared to be the most effective for killing the parasites *in vitro.* Methods of treatment are discussed.

EHLERS. (1938). Beitrag zur Bekämpfung der Pferdeläuse in den Truppenpferdebeständen unter besonderer Berücksichtigung des " Derrilavols ". [**Control of Lice in Army Horses, with Special Reference to " Derrilavol "**].—*Z. Veterinärk.* **50.** 496-506. 2 tables. [Numerous refs.]

A 0·3% solution of " derrilavol " in soft water (with an addition of soft soap) killed lice in 30 minutes, but for general use a 0·6% solution was adopted.

LEHMKE, H. (1938). Versuche zur Behebung der Sterilität bei Rindern und Stuten durch " Enoulan "-Oel (Weizenkeimöl). [**Treatment of Bovine and Equine Sterility with a Vitamin E Preparation, " Enoulan "**].—*Berl. tierärztl. Wschr.* June 24th. 367-369. 1 table.

" Enoulan " wheat germ oil containing vitamin E [the amount is not stated], was injected intramuscularly within three days of the beginning of oestrus into animals affected with sterility ; this was only done when the genital organs (except the ovaries) showed no inflammatory or anatomical changes. Pregnancy was obtained in 3 out of 5 cows, and one mare, with irregular oestrus ; in 4 out of 6 mares with anoestrus ; in 23 out of 30 cows and 2 out of 4 mares, in which there was normal oestrus and no changes in the generative organs, but which had never become pregnant, and in 6 out of 8 cows and one mare which had changes in the ovaries.—A. W. MÖLLER.

POISONS AND POISONING

I. FARGO, J. M., BOHSTEDT, G., PHILLIPS, P. H., & HART, E. B. (1938). **The Effect of Fluorine in Rock Phosphate on Growth and Reproduction in Swine.**—*Proc. 31st ann. Meet. Amer. Soc. anim. Prod. 1938.* pp. 122-125.

II. VELU, H., & CHARNOT, A. (1938). Données nouvelles sur l'étiologie et la pathogénie du darmous. [**The Causation and Pathogenesis of Darmous**].—*Bull. Inst. Hyg. Maroc.* Nos. 1-2. pp. 5-26. 3 figs., 6 plates. [2 refs.]

III. MACHLE, W., SCOTT, E. W., & TREON, J. (1939). **Normal Urinary Fluorine Excretion and the Fluorine Content of Food and Water.**—*Amer. J. Hyg.* Sect. A. **29.** 139-145. 6 tables. [8 refs.]

I. Pigs fed on adequately balanced rations supplemented with various levels of rock phosphate (containing about 3·6% F) were studied from the aspect of live weight gains and effect on reproduction over three generations. Teeth changes were found in brood sows at the lowest level of 0·4% rock phosphate, and 0·8% levels were unsatisfactory for breeding stock although the ill-effects were not noticeable until the suckling period, during which the sows did not eat enough adequately to suckle their young. Growth rates were lowered and food consumption per lb. live-weight gain was increased at this level. Unsatisfactory live weight gains and impairment of suckling and reproductive ability were evidenced at a 1·6% level, although in all cases feeding on green food raised the F tolerance, which appears to be higher in swine than in cattle.

II. The authors continued their investigations into the aetiology and pathogenesis of darmous [see *V. B.* **2.** 509]. In contrast with NaF, CaF_2 does not dissolve in sufficient quantity in water to cause dental lesions in sheep. Sheep normally do not eat soil voluntarily and therefore geophagia cannot be incriminated as a cause of darmous. Analysis of the stomach contents of sheep in the darmous area shows that normally only traces of F are found but during the dry season the F content of the gut rises very considerably, approximating to that of the dry vegetation, and this latter, whether as hay, straw or grain, is the medium by which the F is taken into the animal, and so causes the disease. The F content is still further increased by the presence of dust on the vegetation. This F intoxication is thus seasonal and intermittent, being insignificant in the wet season, which may last three to nine months, and very intense during the dry season. Dental lesions seem only to be produced after several months of prolonged F intoxication, and the teeth of sheep can undergo their whole evolution in this time without being affected. On the other hand serious lesions can appear a considerable time after the F ingestion has been stopped. The authors conclude by stating that the dental condition, darmous, following upon intermittent seasonal ingestion of F from dry forage, even when washed free of the dust of these phosphatic areas (with which the F is associated), only appears slowly, long after the beginning of the intoxication of which the actual mechanism escapes observation at the time. The complete elucidation of this problem is important because of the interest it seems to show for the study of the pathology and physiology of bone.

III. Representative food-stuffs in Cincinatti were found to contain less than 1·7 p.p.m. F where the natural water contained less than 0·1 p.p.m., and the food is considered responsible for the 1 p.p.m. F found in human urine in this area. In parts of Arizona where " mottled teeth " is endemic the water contains up to 18 p.p.m. F, but the F in the foodstuffs was again low, bearing no obvious relation to that of the water. Urine samples from these areas showed figures much above 1 p.p.m., and although the number of samples analysed was small there tended to be a positive correlation between the level of F excretion and the amount of F in the drinking water.—ALFRED EDEN.

SCHULZ, J. A. (1938). **Fluorine Toxicosis in the Albino Rat.**—*Res. Bull. Iowa agric. Exp. Sta.* No. 247. pp. 242. 1 fig., 28 tables. [Numerous refs.]

Mineral mixtures were fed to cattle in the corn belt largely as supplements, the basal ingredients being bone-meal and limestone. As the price of bone-meal mounted rock phosphate was substituted up to 75% in some mixtures. These proved injurious to stock, and assuming that fluorine in the rock phosphate initiated the toxic symptoms, S. attempted to establish the lower limits of toxicity of the fluorides and to find out what factors ameliorated or intensified this toxicity. While injuries to the bones and teeth are early manifestations of F intake, interference with reproduction, growth, and milk production followed long-continued feeding. For convenience white rats were used in the experiments.

NaF fed at the level of 0·01% of the ration caused flaking and mottling of the enamel of incisor teeth. At 0·025% slight inhibition of growth in successive generations was noted, but was more marked at a 0·05% level, the incisor teeth becoming elongated and chalky and reproduction less certain. At levels of 0·10% and 0·15% reproduction was uncertain, growth was stunted, and the incisors formed complete circles outside the jaw or cut through the jowl if not clipped. At 0·20% and 0·25% levels death followed in a few weeks. Bone analysis showed increase in fluoride and Mg and a decrease in CO_2. The percentage Ca and P was changed in young rats but unaffected in adults. Bone composition changes

were restored by normal feeding. The toxicity of NaF was accentuated by low Ca and ameliorated by high Ca in the ration. Cod-liver oil reduced the effect of NaF.

CaF_2 was much less toxic than NaF but produced the same changes when fed at sufficiently high levels. F in rock phosphate was nearly as toxic as NaF. The F in phosphate limestone as used in the experiments was less toxic than that present in rock phosphate, probably owing to the increase in the Ca/P ratio and alkalinity. The residual F in acid (super) phosphate was less toxic than that in rock phosphate, the toxicity approximating that of CaF_2.

S. found it difficult to say at what stage incipient fluorosis became truly toxic fluorosis, and since it was impossible to assess the borderline toxicities in farm animals as evidenced by the mottling of incisor teeth in rats, it was not advisable to suggest any apparently safe levels at which any of the earthy phosphates might be fed.—R. Bamford.

Otto. (1938). Bleivergiftungen bei Pferden und ihre Bedeutung für den Truppenveterinär. [**Importance of Lead Poisoning in Horses in Military Veterinary Work**].—*Z. Veterinärk.* **50.** 554-568. [Numerous refs.]

Danger from poisoning comes from lead mines (smoke, dust, and waste water), drinking from rivers containing lead, from the assimilation of lead paint, and drinking from newly-constructed or damaged water supplies, when the water is " lead solvent ".

The symptomatology of lead poisoning is discussed, together with the effects on the tissues and organs.—V. Chládek (Prague).

Vianello, G. (1939). Considerazioni sull'avvelenamento dei vitelli per ingestione di vernice a minio (Pb_2O_3). [**Poisoning of Calves by Paint Containing Red Lead**].—*Clin. vet., Milano.* **62.** 39-42. [1 ref.]

V. states that recent observations lead him to believe that the danger to calves of paint containing red lead is not sufficiently realized, and that deaths due to this poison are frequently attributed to other causes.

Hykeš, O. V., & Diakov, F. A. (1936). Antagonistický účinek jodových solí na toxicitu octanu thallného a jím vyvolanou alopecii. [**Antagonistic Effects of Iodides in Poisoning and Baldness in Rats due to Thallium Acetate**].—*Biol. Spis. vys. Šk. Zvěrolék.* **15.** [29]-[47]. 1 table. [Numerous refs.] [English summary].

Subcutaneous administration of iodides considerably reduces the toxicity of thallium acetate for rats. There is a marked reduction in mortality, weakening or almost complete disappearance of toxic symptoms, including alopecia, and inhibition of the development of cataract and other resultant eye lesions. It was found that the strongest action was obtained with potassium or lithium iodide; the results with sodium and magnesium iodides were less satisfactory. Calcium iodide would probably have the same biological action as the other iodides in this experiment, but because of the deleterious effect upon the skin of the calcium ion it cannot be used subcutaneously in practical therapy. The iodine acts as an antidote to thallium only if the ratio between thallium received *per os* and iodine given subcutaneously is at least 1:30.—E. Přibyl (Brno).

Anon. (1937). **Selenium Problems in South Dakota.** pp. 30. 6 figs., 4 tables. [Numerous refs.] Brooklings, S. Dakota; State Planning Board [4to] [Mimeographed].

This report is in the nature of a review article on the Se problem, much of the literature on which has already been abstracted in this *Bulletin*. It deals with the early views on " alkali disease ", the incrimination of Se as the causal agent, and a general account of the chemical, geological and geographical distribution of Se in South Dakota. The absorption of Se by vegetation and the so-called " converter plants " is described, and the effect of Se upon the animal body, including accounts of the poison springs of the area, is dealt with thoroughly. Finally the Se problem is discussed in relation to public health, reference being made to obscure disorders amongst inhabitants of the area. As a full and comprehensive review of the knowledge of the Se problem up to 1937 this report will repay ample perusal.—ALFRED EDEN.

FRANKE, K. W., & PAINTER, E. P. (1938). **A New Toxicant Occurring Naturally in Certain Samples of Plant Food-Stuffs.—XVIII. A Study of the Toxicity and Selenium Content of Seleniferous Diets : With Statistical Consideration.** —*Cereal Chem.* **15.** 1-24. 3 figs., 4 tables. [Numerous refs.] [Copied from abst. in *Exp. Sta. Rec.* **79.** 667].

In a further report the results of numerous rat-feeding trials, involving a total of 38 seleniferous diets and 382 experimental animals, are summarized. The sources of Se in the various rations include sodium selenate, and that naturally occurring in wheat, corn, barley and emmer.

A high degree of correlation was found between the toxicity and the Se content of the various rations, although Se from different sources varied in toxicity. Considering Se as the sole toxicant in the cereals fed, the relative toxicity of this element in the different diets ranked in the following order :– wheat, corn, barley, selenate, and selenite. Over 10 p.p.m. of naturally occurring Se in the diets invariably resulted in pronounced restriction of food consumption, and in practically all cases 9 p.p.m. caused death in the young animals. A concentration of less than 5 p.p.m. prevented normal growth, and the gain per g. of diet consumed was less on seleniferous than on normal diets. Females were slightly less susceptible to Se poisoning than males, and the toxic effect seemed to depend more on the concentration of selenium in the diet than on the amount actually ingested daily. There was some evidence that the toxicity of grains decreased during prolonged storage.

FINNER, Lucy L., & CALVERY, H. O. (1939). **Pathologic Changes in Rats and Dogs Fed Diets Containing Lead and Arsenic Compounds. Compounds Used : Lead Arsenate, Arsenic Trioxide, Calcium Arsenate and Lead Acetate.**—*Arch. Path.* **27.** 433-446. 3 figs., 2 tables. [8 refs.]

The results obtained from a microscopic examination of the blood, viscera and skeletal tissues of four groups each of four pairs of rats, and one group of 29 dogs are reported and show that under the conditions of the experiments, injuries of tissues were caused by both lead and arsenic. The most marked histological changes were produced in the kidneys. The ingestion of lead even at very low levels caused the most severe injuries to the tissues ; some dogs fed as little as 0·33 mg. of lead per kg. body weight per day died before scheduled termination of the experiment.

Details of a special technique for microscopic examination of the tissues of the lead-treated animals are given. The history of the animals in the various groups and the data on their nutritional, chemical and therapeutic status are published elsewhere.—R. ALLCROFT.

KUSCHER, A. (1938). Karbidvergiftung bei Hühnern. [**Carbide Poisoning of Fowls**].—*Wien. tierärztl. Mschr.* **25.** 692-693. [4 refs.]

An account of illness, followed by recovery, in 15 hens that ate carbide thrown on to a refuse heap.—SASSENHOFF (MUNICH).

WEIDENMÜLLER, H. (1938). Toxikologische Untersuchung einiger quecksilberhaltiger Saatbeizmittel. [**Toxicological Tests of Mercury Preparations Used as Preservatives of Seeds**].—*Berl. Münch. tierärztl. Wschr.* September 9th. 543-546. [Numerous refs.]

In order to preserve grain from attack by moulds, it is sometimes treated with chemical compounds. Three organic mercury preparations in powder form used for this purpose were tested for their action on the skin and respiratory system of rabbits. Rabbits were subjected on alternate days for 18 days to the action of this preparation when administered as a cloud of dust. They reacted by coughing and sneezing, but did not suffer any other ill-effects. To observe the effect on the skin the preparations were rubbed at three day intervals into patches of skin, both shaven and unshaven. No local irritant action followed, but the animals died after about 5-11 days from acute mercury poisoning. This shows that these preparations are potentially dangerous.—SASSENHOFF (MUNICH).

PARREE, W. (1937). Mededeeling over den stand van het vraagstuk " gasbescherming van paarden " in het K.N.I.L. [**Protection of Horses from Poison Gas**].—*Ned.-ind. Bl. Diergeneesk.* **49.** 263-276. 3 figs.

In experiments carried out in Holland horses were found to be at least as susceptible as man to the effects of mustard gas, with the difference, however, that instead of causing blisters the gas produced necrosis in the skin. The feet and hoofs were found to be sufficiently protected from the gas by the thick hair and horny layers. Tear and nose-irritant gases appeared to have very little effect on the horses. The technical difficulties inherent in the construction of a satisfactory gas mask for horses are briefly discussed.

PHYSIOLOGY

DEL RIO-HORTEGA, P. (1939). **The Microglia.**—*Lancet.* **236.** 1023-1026.

The microglia, although not a part of the fundamental architecture of all nerve tissue, is described as a regular constituent. Mesodermal in origin from meningeal polyblasts, the microglia cells soon become distributed through the body, where they take on the specific function of phagocytosis in all nerve centres. In health they remove the products of normal metabolism, while in disease they rapidly migrate to the seat of injury and assist in removing the products of disintegration. The macroglia—astrocytes and oligodendrocytes—are ectodermal in origin and have no phagocytic activities.—C. W. OTTAWAY.

LANDSBERG, J. W. (1939). **The Blood Picture of Young, Normal Dogs.**—*J. Amer. vet. med. Ass.* **94.** 595-600. 4 figs., 4 tables. [13 refs.]

Blood samples from 95 worm-free dogs (38 male and 57 female) of an average age of 102 days and weight of 4·5 kg. were taken to determine the complete haematological picture in young, normal dogs. Samples were obtained by cardiac puncture. The average counts per c.mm. were as follows :- erythrocytes, 5,004 millions with a concentration of 8·92 g. haemoglobin and a volume of 37·82 c.c. packed erythrocytes per 100 c.c. ; total leucocytes, 11,895, and thrombocytes, 154,879. The

mean reticulocyte count on 45 animals (male and female) was 1·36%. In female animals the number of erythrocytes, the concentration of haemoglobin, and the volume of packed red cells was found to be higher than in the male.—C. W. O.

HÖELZLE, E. (1938). Ueber die Oberflächenspannung des Kälberblutes. [**Surface Tension of Calf-Blood**].—*Inaug. Diss., Munich.* pp. 47. 31 tables. [Numerous refs.]

100 samples of calves' blood were obtained from an abattoir. The average dynamic surface tension found by the stalamometer was 68·29 Dyn/cm., the variation being 61·25-71·83 Dyn/cm. The static surface tension measured by the Michaelis capillary method was also tried but the viscosity of whole blood was found to be too great and only diluted blood could be used. The surface tension relative to water measured by this method was 0·9019. The surface tension of the blood was found to decrease as the age and weight of the animals increased. The Meiostagmin reaction was tried on a few animals, and gave a positive result with a tuberculous bull by both methods.—A. T. PHILLIPSON.

RUNGE, W. (1938). Die Beziehungen zwischen spezifischem Gewicht, Oberflächenspannung und Viskosität im Harn kranker und gesunder Hunde. [**Interrelation Between Specific Weight, Surface Tension and Viscosity of the Urine of Diseased and Healthy Dogs**].—*Inaug. Diss., Giessen.* pp. 72. 4 graphs. [Numerous refs.]

Besides the determinations indicated in the title a complete analysis was made of all samples of urine. Urine from fifty healthy dogs was examined once in this way, while urine from 10 others, of which 8 were suffering from nephritis, was examined over periods varying from 6 to 34 days. In the first group the average specific weight of the urine was 1,021; the average viscosity of filtered urine was 1·1111 cp. and of unfiltered urine 1·3625 cp.; the surface tension of the filtered urine gave an average of 64·139 Dyn/cm. and the unfiltered urine 63·874 Dyn/cm. The presence of albumin and bile in the urine caused a greater decrease in surface tension if the specific weight was high than if it was low. The presence of albumin and bile had only a very slight effect upon the specific weight and viscosity of the urine.

As a rule the specific weight, surface tension and viscosity are independent of one another but viscosity and surface tension have a rough relationship to each other.—A. T. PHILLIPSON.

SCHIRRMEISTER, E. (1939). Studien über Veränderungen des Zellgehaltes der Milch im Stall gehaltener Rinder wahrend der Futterumstellung. [**Alterations in the Cell Content of Milk of Stall-Fed Cattle Due to Change of Diet**]. —*Inaug. Diss., Berlin.* pp. 26. 1 table. [Numerous refs.]

Samples of milk were taken from 40 animals before and after a change from winter to summer diet; 3 samples taken at intervals of 8 days before the change, and 4 samples taken during 20 days after the change, were examined from each animal. Smears of 0·02 or 0·04 c.c. of milk were fixed and stained, and the cells were counted. The results after the change in diet were:—(1) in 23 animals there was no change in the cell count; (2) in 8 animals an increase occurred, and (3) in 9 animals with chronic mastitis no change was found. In 3 animals in which oestrus occurred during the experimental period, an increase in the number of leucocytes was found in the milk.—A. T. PHILLIPSON.

SNYDER, F. F. (1938). **Factors Concerned in the Duration of Pregnancy.**—*Physiol. Rev.* **18.** 578-596. [Numerous refs.]

There is much evidence that not only parturition but also other critical phases of embryonic life, *e.g.* ovulation, fertilization, transport of the ova and implantation, are under hormonal control. Certain manifestations of the sexual cycle occur during pregnancy in different species, and it is suggested that the length of gestation is approximately a single multiple of the cycle. Normal parturition involves two types of changes, namely (1) muscular—an increase in the contractility of the uterine muscle, and (2) decidual—separation of the placenta. These can be dissociated experimentally.

In the horse, ovulation occurs in the early stages of pregnancy, markedly increasing the luteal tissue present in the ovaries; later the corpora lutea regress. During the early stages of pregnancy the blood of the mare contains large quantities of gonadotropic hormone. In the cow the Graafian follicles may attain their full size and there are many atrophic follicles present in the ovary during gestation; oestrus and mating occasionally occur at almost all stages of pregnancy. Evidence of a follicular rhythm during pregnancy is also found in the g. pig and the rat. There is also evidence of abortive menstrual cycles in the monkey and the human subject.

Differences in the gestation periods of different breeds of rabbits are dependent upon hereditary factors, and the same is true for different breeds of horses. Variations in the gestation periods of a species are such that the average gestation period may approximate a multiple of the cycle, the series of pregnancies under consideration including extreme cases which range from the beginning of viability to the end of the period of post-maturity of the foetus.—J. M. ROBSON.

BUHSE, W. (1938). Erfahrungen über Trächtigkeitsfestellung bei Stuten mit der Cuboni-Reaktion sowie Versuche zur Bestimmung des Reaktionskörpers. [**Cuboni's Test for Pregnancy of Mares**].—*Inaug. Diss., Berlin.* pp. 60. 10 tables. [Numerous refs.]

301 samples of urine from mares were tested by this method, and the following conclusions were drawn. A definite diagnosis can be given by the 150th day of pregnancy; at 120 days a 10% error in diagnosis occurs. In some animals more than one test must be made in order to establish a diagnosis. In the typical reaction curve, a positive result occurs first after 90-120 days pregnancy; the reaction then increases in intensity until the end of gestation. Some animals give a positive reaction as early as the second month of pregnancy, while in others a positive result is delayed, in one case recorded as late as the seventh month of pregnancy.

With abortion, the reaction curve has an abrupt fall after a previous positive or indefinite reaction, depending on the length of pregnancy. Several types of atypical reaction curves are also described. These account for the 10% error which occurs at the 120th day of pregnancy.—A. T. PHILLIPSON.

ELKAN, E. R. (1938). **The Xenopus Pregnancy Test.**—*Brit. med. J.* Dec. 17th. 1253-1256. 1 text fig., 3 figs. on 1 plate. [19 refs.]

E. advocates the use of the South African clawed toad, *X. laevis*, for the diagnosis of human pregnancy. The test depends on the response of the animal's gonads (female) to anterior-pituitary-like hormone present in the urine of pregnant women. The urine may be injected untreated or after treatment by Zondek's method. A positive result is indicated by ovulation within 5-12 hours. Of 150 tests performed by E., 62 gave a positive and 88 a negative reaction. All clear

positives were found to be correct; there were 10 weak positives, which were later shown to be negative, and 3 negatives that subsequently became positive. The advantages claimed for the test are the speed with which a diagnosis can be given, and the fact that no animals need be killed to obtain the result; the toads can be used repeatedly, as, if there is sufficient interval between the tests, they do not become desensitized.—N. J. SCORGIE.

COLE, R. K. (1938). **Histology of the Oviduct of the Fowl in Relation to Variations in the Condition of the Firm Egg Albumen.**—*Anat. Rev.* **71.** 349-361. 8 figs. on 2 plates, 1 table. [16 refs.]

The method adopted in this investigation was the correlation of interior egg quality with the histological structure of the oviduct, particularly in the albumen-secreting region. Observed variations in the condition of the firm albumen layer of fresh eggs depend on the number and distribution of the mucin-like fibres in this layer. These fibres are produced by the goblet cells lining the albumen-secreting region of the oviduct; details are given as to the number of the goblet cells in the several portions of this region. The general conclusion is that fowls producing eggs with firm albumen of good condition, possess a consistently higher goblet cell content throughout the albumen-secreting region than those producing a more watery type of firm albumen.—N. J. SCORGIE.

TECHNIQUE AND APPARATUS

MARTIN, L. C. (1938). **The Electron Microscope.**—*Nature, Lond.* **142.** 1062-1065. 3 figs.

The construction of the electron microscope is briefly described and the possibilities and problems of electron microscopy discussed. The instrument roughly resembles an ordinary microscope, the electrons being emitted by electrical discharge from the top of the tube, passing down it through the object to be examined and thence to a photographic plate at the bottom. In place of glass lenses to concentrate the rays, two coils of iron wire are used. Photographs have been published showing various organisms such as *Micrococcus flavus* under very high magnification such as 16,000. Bacteria are dried by a special process on an extremely thin film of collodion and then photographed without any other special treatment.—R. ALLCROFT.

LESTOQUARD, F. (1939). L'iode dans la coloration des *Rickettsia.* [**The Use of Iodine in the Staining of Rickettsia**].—*Bull. Soc. Path. exot.* **32.** 466-467. [1 ref.]

L. draws attention to the use of iodine as a mordant for rickettsia before staining with Giemsa. He recommends fixing in iodized alcohol (alcohol 98 parts, tincture of iodine 2 parts) for 8-10 minutes, then washing in alcohol, to remove the iodine, and staining with Giemsa.—U. F. RICHARDSON.

MISCELLANEOUS

LECLAINCHE, E. (1939). L'enseignement vétérinaire et son adaptation aux exigences modernes. [**Veterinary Education and its Adaption to Modern Needs**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 127-134. [In French: English, German and Italian summaries].

Speaking on the principles of veterinary education L. first stresses the importance of requiring the highest possible level of general education for candidates for

admission as veterinary students, then goes on to emphasize the indivisibility of zootechny and what is generally considered as veterinary science. Zootechny, including animal management, breeding and feeding, ought to be taught more thoroughly in veterinary schools and the different animal species ought to be considered individually. Comparative anatomy, pathology and medicine tend to be overdone. Finally, preventive medicine should be further developed.

On the more personal side, L. draws attention to the value of veterinary associations as a means of post-graduate education.—J. E.

HABERNOLL, A. (1938). Die Haustiere als Ursache von Unfällen in Deutschland unter besonderer Berücksichtigumg der Berufsverletzungen der Tierärzte Preussens. [**Domestic Animals as Cause of Accidents in Germany, with Special Reference to Occupational Diseases of Veterinarians in Prussia**]. —*Berl. Münch. tierärztl. Wschr.* July 1st. 393-395, and July 8th. 407-410. 6 tables.

Official records for the period 1926-1934 show that the annual number of fatal accidents to human beings caused by domestic animals fluctuated between 298 and 417. By far the largest number of these fatalities were caused by horses and cattle (65·9% and 29·8% respectively), other domestic animals being responsible for only 3·5% of the total. A remarkable feature was the very small number of veterinarians involved: during the whole period under review only three received fatal injury; of the 975 practitioners who answered a questionnaire only 186 reported having suffered from more or less serious occupational accidents.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1939). **Report of the Medical Research Council for the Year 1937-1938.** pp. 221. [Numerous refs.] London: H.M. Stat. Off. [8vo] [3s. 6d.]

The report is divided into the following main sections:– (1) an introduction, describing briefly the general nature of research work covered; (2) the work of the National Institute of Medical Research; (3) the determination of biological standards and the methods of biological assay and measurement; (4) clinical research units; (5) external research schemes; (6) research work aided by grants; (7) research in tropical medicine; (8) industrial health, and (9) travelling fellowships. The composition of the investigation committees for special subjects is given in an appendix.

A grant-in-aid of £195,000 was voted by parliament during the financial year, £10,000 being allocated to administrative and travelling expenses of the Council, £60,000 for the National Institute for Medical Research at Hampstead and the farm laboratories at Mill Hill, £95,000 for research grants to scientific work elsewhere and £30,000 for new buildings required for research in chemotherapy. Important additions to this public monetary grant were received from other sources.

The National Institute for Medical Research

Viruses.—The report gives further information regarding egg-membrane culture of viruses and of work on measuring the size and density of infective units of viruses by centrifugal methods.

Transmissible Tumours.—Work on the production of malignant tumours by the injection of virus-like filtrable agents and tar was continued.

Chemotherapy.—Information is given of further research carried out on remedial agents for trypanosome infections. Certain long-chain aliphatic compounds with terminal guanidine or amidine groups are effective trypanocides, but

are nearly toxic in therapeutic doses. Further chemical work on these compounds is proceeding. The Institute programme included research work on many other subjects.

External Research Schemes

A very wide range of subjects was studied at outside institutions with the help of monetary grants from the Council; several of them are of veterinary interest. At Cambridge GRIFFITHS completed his experiments on the comparative susceptibility of the vole to infection with the three types of tubercle bacillus and the vole strain of acid-fast bacillus (WELLS) and continued an inquiry into the relative frequency of the human and bovine types of tubercle bacillus in the sputum in human cases of pulmonary tuberculosis in Great Britain. At Cambridge MARTIN, CHICK, and MACRAE have worked on the factors in the vitamin B complex which are necessary for the normal nutrition of pigs. MELLANBY of Sheffield has published an account of his work on the experimental production of deafness in young dogs by diets deficient in vitamin A and rich in cereals.

Biological Standards

Reference is made to the use of a dry vacuum for use in the preparation and maintenance of serum standards. A new international standard for staphylococcus antitoxin was set up in 1938 and work is continuing on staphylococcal haemolysin, tetanus antitoxin and vitamin B_1. Certain hormones have also been provisionally standardized. At the Standards Laboratory for Diagnostic Suspensions and Sera, Oxford, a dried *Brucella abortus* serum has been prepared and stored.—J. C. WALLACE.

GREAT BRITAIN. (1938). **The Lister Institute of Preventive Medicine: Report of the Governing Body for 1938.** pp. 24. London: Lister Institute of Preventive Medicine. [4to].

VIRUS DISEASES.—AMIES carried out further research on the nature of tumour-producing agents in filtrates of avian sarcomata; previous results were confirmed. Research on vaccinia by various workers is dealt with, including investigations on the antigenic structure of vaccinia virus, vaccinia elementary bodies and the preparation of vaccine for human use.

SEROLOGICAL STUDIES.—SCHÜTZE and GORER continued research on the possible relationship between antibody production and resistance to disease. Serum obtained by PETRIE and HENDERSON from rabbits and horses after immunization with streptococci had no protective value for mice. HENDERSON completed a preliminary examination of the bacterial antigens of the *Clostridium welchii* group.

GENERAL BACTERIOLOGICAL STUDIES.—KERR (in Northern Ireland) worked on trichomonas as a cause of abortion and sterility in cattle and the investigation by STABLEFORTH on cutaneous streptothrix infection in the horse is recorded. KLEINBERGER investigated pleuropneumonia-like organisms, some of which have been isolated from cases of animal disease. HENDERSON and MCCLEAN commenced a study on the influence of tissue permeability on bacterial invasion by *Cl. septique* and *Cl. welchii*.

ENDOCRINOLOGY.—Studies on the effects of sex hormones were continued, and included enquiry into their bisexual function, pathological changes produced by sex hormones and their action on the adrenals and the liver.

NUTRITION.—Reference is made to the work on standardization undertaken in connexion with vitamins A and B_1, and to research at the Institute of Animal Pathology, Cambridge, on the nutritional disease produced in pigs fed chiefly on maize and casein.

National Collection of Type Culturfs.—Over 200 new strains were deposited for maintenance.

The report concludes with a list of scientific papers published from the laboratories of the Institute during the year.—J. C. Wallace.

Great Britain. (1939). **Report of the Governing Body, Lister Institute of Preventive Medicine, 1939.** pp. 39. [Numerous refs.] London: Lister Institute of Preventive Medicine. [4to].

Virus Diseases.—Amies and Carr studied further the nature of the filtrable agents of avian sarcomata. Research on vaccinia by various workers was undertaken, including investigations on the antigenic structure of the virus, vaccinia elementary bodies, the cultivation of the virus on the chorio-allantoic membrane of the developing chick, and the chemical nature and enzymic activity of the virus.

Serological Studies.—Henderson has continued work on the *Clostridium welchii* group; a report is being prepared for publication. Research on antibodies by various workers is recorded, including immunity to tumour-transplantation and antibody production in response to immunization with protozoa.

General Bacteriological Studies.—The study of *Trichomonas foetus* as the cause of abortion and sterility in cattle was continued by Kerr in collaboration with the Institute. Henderson and McClean have continued their observations on the influence of tissue permeability on bacterial invasion.

Endocrinology.—Korenchevsky proceeded with his investigation of different aspects of the activity of sex hormones, for example their effect on senility, on castrated males and on ovariectomized females.

Nutrition.—Details are given of the Institute's work on vitamin standardization and of research in connexion with various groups of vitamins. The work of Martin, Chick and Macrae at the Institute of Animal Pathology, Cambridge on the nutritive requirements of the pig is dealt with.

The report concludes with a list of scientific papers published from the laboratories of the Institute during the year.—J. C. Wallace.

Eire. (1938). [**Report of**] **Veterinary College of Ireland** [**1937-1938**].—*Rep. Minist. Agric. Eire, 1937-38.* pp. 35-41 and p. [27]. 2 tables.

There were 180 students in the college during the year, 69 being new entrants. The results of the examinations of the Royal College of Veterinary Surgeons are shown in a table.

Routine Laboratory Work.—83,859 specimens examined in the laboratory during the year consisted of 79,464 for the agglutination test for *Salmonella pullorum* infection in poultry, 579 for the agglutination test for contagious abortion in cattle, and 3,816 morbid specimens for diagnosis; an analysis of the results showing the various conditions found is given.

Poultry Diseases.—The following outbreaks are recorded (figure in brackets gives outbreaks in 1936-1937):—coccidiosis 206 (154); *Salmonella pullorum* infection 106 (109), and tuberculosis 150 (127). An increase in the number of cases of fowl paralysis is reported and worm infestation is a serious problem.

Diseases of Other Animals.—Contagious abortion, sterility and mastitis in cattle, worm infestation in young thoroughbred horses and sterility in mares are conditions mentioned as requiring investigation. Work has been done on pneumonia in young pigs and advice given on diseases of silver foxes.—J. C. Wallace.

Eire. (1938). [**Report of**] **Veterinary Research Laboratory** [**1937-1938**].—*Rep. Minist. Agric. Eire, 1937-38.* pp. 69-70.

The following specimens were received for examination :– anthrax 13 ; contagious bovine abortion 622 ; parasitic mange 5 ; sheep scab 281 ; swine fever 165 ; tuberculosis 2,342, and miscellaneous 205. The anthrax, parasitic mange, and swine fever material proved negative ; 208 scrapings of wool contained sheep scab acari.

The following vaccines were issued :– anti-abortion 5,090 doses, blackleg 17,030 doses, and braxy 20,159 doses. Research work was continued on problems connected with contagious bovine abortion and tuberculosis in swine.—J. C. W.

INDIA. (1938). **Annual Report of the Imperial Council of Agriculture Research for 1937-38.** pp. 168. 12 appendixes. Delhi : Manager of Publications. [8vo] [12 annas : 1s.]

Legislation that may be employed for the co-ordination of the control of livestock diseases is still under consideration.

The recommendations of the animal husbandry section in the report of the previous year regarding castration, vaccination, etc., were generally acceptable to the various Provinces and States. In order to retrieve lost trade in livestock it is recommended that quarantine stations be established at the four larger ports, and investigation is to be made on the diseases of sheep and goats awaiting export. Funds have been supplied for research into methods of TICK CONTROL in Bombay Presidency.

Information is being collected regarding the indigenous drugs used and methods of treatment adopted by experienced cattle breeders in India. Systematic work on the parasites of stock has begun ; the necessity of co-ordinated work on diseases of poultry is emphasized. In the Punjab a deficiency of minerals in fodder appeared to have a bearing on the degree of PARASITIC INFESTATION of stock, and the supplying of a balanced ration helped greatly in the elimination of parasites. SURRA has been shown to be widespread in bovines, but does not, under ordinary circumstances, cause heavy mortality. Much useful work has been accomplished by Veterinary Investigation Officers, and the Council has recommended that the service be extended.

141,000 cattle were vaccinated with goat virus against RINDERPEST in the Central Provinces and Berar.

Work on the WARBLE FLY has been started in Muktesar. A research officer is to be trained in the United Kingdom for research work on TUBERCULOSIS and JOHNE'S DISEASE and another for work on poultry diseases.—F. J. ANDREWS.

UNION OF SOUTH AFRICA. (1938). **Annual Report of the Division of Veterinary Services for 1937.** [DU TOIT, P. J.]—*Fmg S. Afr.* **13.** 496-497 and 505-518. 9 tables.

The report is divided into two sections dealing with (1) laboratory work at Onderstepoort, and (2) field work. During the year a very heavy call was made on the field staff in connexion with the outbreaks of foot and mouth disease, first in the Barberton district and later in Northern Natal. These outbreaks were successfully dealt with by the slaughter-out policy.

I. LABORATORY WORK.

INFECTIOUS DISEASES.—Increase in the production of most of the vaccines issued was recorded. There was a great increase in the demand for pure anaplasmosis vaccine as a result of the spread of the disease in Bechuanaland. Several cases of THEILERIASIS associated with Koch's bodies were tested on recovery with East Coast Fever infected ticks, and died of the disease, demonstrating that the

type of theileriasis from which they had previously suffered was *Theileria mutans* infection.

Complement-fixation tests for DOURINE carried out at regular monthly intervals showed that there has been little variation in the titre of the reaction in animals observed over a period of four years. Three out of five mares exposed to an infected stallion became infected, and *Trypanosoma equiperdum* could be demonstrated in vaginal washings.

With regard to NAGANA, the campaign against tsetse flies using the Harris trap has been continued on an increasingly extensive scale. The numbers have decreased to such an extent that the flies are more and more dependent on wandering big game animals for their distribution.

From an outbreak of a disease in dogs in the Eastern Transvaal *Rickettsia canis* was isolated and research work on RICKETTSIOSIS is proceeding. Investigation of the duration of immunity in heartwater showed that recovered sheep were still immune after two years.

During the year five antigenically different neurotropic strains of HORSE-SICKNESS virus were included in the vaccine, which continued to give very satisfactory results. It was found that the antibody content of the serum of a horse was probably not a true index of its immunity. A physicist was appointed to help in the investigation of the filtrability of virus. Many unsuccessful attempts were made to infect laboratory animals with BLUETONGUE by a great variety of methods but without success. Some evidence was obtained that there is more than one strain of bluetongue. The inoculation of rabbits for the diagnosis of RABIES infection was discontinued in favour of mouse inoculation, which has the advantage of enabling a diagnosis to be made in ten days in most cases.

The results of the "block" inoculations against ANTHRAX in the Transkei have been very successful and show the value of systematic animal inoculation. A vaccine made from avirulent rough strains gave a satisfactory protection against infection in the field.

The technique of the agglutination test for BRUCELLOSIS was revised in order to bring it into line with that used in Great Britain and recommended by STABLEFORTH.

A number of different types of vaccines against SALMONELLOSIS were tried out on laboratory animals. These included auto-endotoxoids of *Salmonella enteritidis* and *S. typhi*. The results were roughly the same with all the vaccines used.

An outbreak of DYSENTERY in young foals on a stud farm in the Cape Province was found to be due to *Clostridium welchii* type B, the cause of lamb dysentery.

PARASITOLOGY.—A great deal of work was done on HOOKWORMS in sheep and an emulsion of tetrachlorethylene is now issued to farmers for treating sheep. A commencement was made with a survey of TICKS in the Union.

NUTRITION.—A programme of work on deficiency aspects of nutrition was carried out, mainly confined to the protein aspect.

PHYSIOLOGY.—Studies on photosensitization were continued, and a programme of work on certain aspects of ruminant digestion was commenced, a study being made of rumenal movements and the fauna of the fore stomachs.

PHARMACOLOGY and TOXICOLOGY.—Experiments on the toxicity of aluminium were undertaken. The detection of strychnine in carcasses after various periods was undertaken, and several poisonous plants were studied in order to try to isolate the toxic principles. These included *Dimorphotheca sinuata* and *Lotononis laxa*.

MEAT and MILK HYGIENE.—During the year the new building for the study of problems relating to meat was completed. A good deal of preliminary work

was done on mastitis in South African herds, and a comprehensive programme of research work is being undertaken.

In addition to the sections of the work previously mentioned, the programme of experimental work on ZOOTECHNY, mainly at the farm Armoedsvlakte in Bechuanaland, was continued. Wool research was continued on a big scale, and a great deal of development took place in poultry research.

During the year a commencement was made with the campaign against BACILLARY WHITE DIARRHOEA in chickens.

II. FIELD WORK

The activities of the field staff were mainly devoted to the combating of F. & M. DISEASE. Three outbreaks occurred, one in Northern Natal, one in Barberton and a small one in the Kruger National Park. The slaughter-out policy was undertaken in all three outbreaks. Burning was found difficult, and the animals were shot and buried in deep trenches, dug with mechanical shovels. It was found that ·22 cartridges were more suitable than ·303. In Natal two conditions, with lesions on the tongue and gums, were encountered in cattle, but proved not to be F. & M. disease. One was a very superficial erosion, but in the other there were lesions present which very closely resembled those of F. & M. disease.

Several new centres of infection of RABIES were discovered and experiments on the gassing of meerkat colonies were continued.

EPIZOOTIC LYMPHANGITIS remained localized to the coastal districts of the Eastern Cape Province. It appears to be associated with heavy tick infestation (*Amblyomma hebraeum*).

There was a decrease in the total number of outbreaks of SHEEP SCAB during the year, but there was a setback in the Transvaal where there were several fresh outbreaks.

Material progress was made in the eradication of DOURINE in the Western Province, one district being completely cleared up.

Marked improvement was noted in the ANTHRAX position in the Transkei and Natal, where mass inoculations were carried out. The position in other areas remained the same.

The position with regard to EAST COAST FEVER continues to improve, and in the Transkei no outbreaks were recorded during the year. In Natal there were 15 outbreaks, almost confined to two districts.—E. M. ROBINSON.

NYASALAND PROTECTORATE. (1938). **[Report on] Cattle [1937].**—*Rep. Dep. Agric. Nyasald, 1937.* p. 62.

This is a short report on an attempt to keep cattle, apparently working bullocks, on a cotton station where tsetse fly is common. On the outbreak of the rains regular injections of antimosan (Bayer) were given [no details], but five bullocks died from trypanosomiasis. At the end of the season only four bullocks remained —the original number is not stated. No treatment was given during the dry season, and the bullocks improved in condition, and were worked between July and November. Treatment had to be restarted in October. Blood smears were taken at regular intervals, and trypanosomes were invariably found from two of the surviving bullocks and less regularly in the other two.—F. J. ANDREWS.

ZANZIBAR PROTECTORATE. (1939). **Report of Veterinary Work, 1938.** [AHMEDI, F. D.]—*Rep. Dep. Agric. Zanzibar, 1938.* pp. 12-13. 1 table.

A few cases of trypanosomiasis in dairy cattle were observed. Tsetse flies have never been seen in Zanzibar, so it is thought that other biting flies transmit the disease. Piroplasmosis and fowl typhoid are also mentioned.

The number of animals slaughtered at Zanzibar is given and it is recorded that the Veterinary office trained two pupils and instructed sanitary inspectors in meat inspection.—J. E.

COLONY OF GAMBIA. (1938). **[Report on Livestock [1937-1938].**—*Rep. Dep. Agric. Gambia, 1937-38.* pp. 17-19.

A veterinary officer visits the Colony for six months each year to immunize the cattle against rinderpest. A rinderpest immunization scheme was commenced in 1933. 1,800 head of cattle were immunized in 1935-36, 11,690 in 1936-37 and 8,626 in 1937-38; the scheme will be completed in the 1938-39 season. In the absence of the veterinary officer attempts are made to control the disease by local quarantine orders, but there are difficulties that stand in the way of success. The mortality in two outbreaks was 2,000, 5% of the total cattle of the country. Details are given of the incidence of the disease.

Active immunization has to be carried out with special care, because of the high susceptibility of the local cattle. Spleen vaccine is injected and after 14 days serum and virus are given, followed a week afterwards by an injection of virus. Both serum and vaccine are produced locally in the field.—F. J. ANDREWS.

ANTIGUA. (1938). **Annual Report of the Veterinary Officer, Antigua, for 1937.** [HUTSON, L. R.] pp. 5. 3 tables. Antigua: Govt. Printer. [fcp] [2d.]

ANIMAL DISEASES.—No outbreaks of epidemic contagious disease occurred. BOVINE TB. claimed many victims and control legislation is to be introduced. TETANUS was observed in horses. A few cases of STRANGLES were successfully treated with sulphanilamide. An outbreak of INFECTIOUS FELINE GASTRO-ENTERITIS caused severe losses. Manson's eyeworm, *Oxyspirura mansoni* was recorded in poultry.

ANIMAL HUSBANDRY.—In order to improve the local livestock, five breeding centres were established at each of which a three-quarter bred Holstein-Zebu bull and a British Alpine buck goat were placed for service. A Large Black boar is also to be placed at each of these centres. Cattle are used for draught work on most of the sugar estates. Horses and donkeys are used much more commonly than mules. A total of 2,979 animals passed through the public slaughter market. 304 animals of all kinds were imported, and hides and skins to the value of £838-15-0 were exported.—R. FISHER.

BRITISH GUIANA. (1939). **Report of the Veterinary Division for 1937.** [BONE, T.] —*Div. Rep. Dep. Agric. Brit. Guiana, 1937.* pp. 99-101. 1 table.

This year's report is very short, the only animal disease mentioned being anthrax, of which two outbreaks occurred. Notes are also given on animal husbandry, the stock farms and animal export.—J. E.

ESTONIA. (1938). Diagnostilise osakonna uurimistegevusest 1937. aastal. **[Report of the Diagnostic Section of the State Serum Institute, Tartu, for 1937].** [SIKKUT, M.]—*Eesti loomaarstl. Ring.* **14.** 143-150. [German summary].

Out of 2,016 milk samples examined for MASTITIS 216 were positive for *Streptococcus agalactiae*, while in 17 cases infection was found to be due to coliform bacteria, in 3 cases to staphylococci, and in 10 cases to *Str. pyogenes*.

2,554 specimens were examined for TUBERCULOSIS, comprising 1,432 milk samples, 1,114 bronchial mucus samples, 7 uterine mucus samples and an organ in one instance. *Mycobact. tuberculosis* was present in 19 milk samples, in 182 bronchial mucus samples, and in one uterine mucus sample.

During the year 22,884 specimens were examined. The diagnostic work was mainly concerned with BRUCELLA INFECTION, TUBERCULOSIS and STREPTOCOCCAL MASTITIS of cows. Of 16,803 blood samples examined for BRUCELLOSIS, 823 were positive.

11 cases of RABIES, 364 of SWINE ERYSIPELAS and 14 cases of ANTHRAX were diagnosed. More detailed data are given in a table. Antirabic vaccine was issued for use on 142 animals.—ELFRIIDE RIDALA (TARTU).

HOLLAND. (1939). Jaarverslag van den veterinair hoofdinspecteur van de volksgezondheid, belast met het toezicht op de uitvoering van de vleeschkeuringswet, staatsblad 1919, No. 524, over het jaar 1937. [**Holland : Report of the Veterinary Inspector for Public Health and Meat Inspection for 1937**]. [BERGER, H. C. L. E.] pp. 123. Numerous tables. The Hague : Public Health Department. [4to].

Meat consumption decreased during the year on account of general unfavourable economic conditions.

Statistical information is given on numbers of animals slaughtered, condemned and destroyed in the various meat inspection areas, also on the numbers and percentages of cases of cysticercosis, echinococcosis and tuberculosis observed. Cysticercosis was most common in Groningen (in 1·5 % of cattle) and in Drenthe (in 2·3 % of calves). Echinococcosis varied greatly in incidence and in the different species of animal and was prevalent in horses in Friesland and around Rotterdam. TB. was present in 73,980 adult cattle (20 %) and in 65,048 pigs (5·5 %). A few cases of Johne's disease were also seen.

Three outbreaks of meat poisoning are recorded :– paratyphoid infection from foal meat, *S. typhi-murium* infection from horse meat and botulism from a pig. —J. E.

HOLLAND. (1937). Mededeelingen betreffende den Gezondheidsdienst voor Vee in Friesland. Achttiende jaarsverslag 1 Mei 1936-30 April 1937. [**Report of the Animal Health Service for Friesland for 1936-1937**]. [VEENBAAS, A. H.] pp. 32. 2 tables, 2 graphs. [8vo].

The control of bovine tuberculosis in cattle is progressing. There was extension of tuberculin testing ; 11·6 % of the cattle tested yielded positive reactions against 13 % in the previous year, and the number of herds free from infection rose from 4,800 to 6,110.

For the control of Johne's disease in cattle the use both of microscopic examination of faeces and of the intradermal test with avian tuberculin is recommended.

A campaign was initiated in 1936 for the control of infectious abortion in bovines, 11,000 cattle on 370 farms being tested : 57 farms were free from infection. In 1936 no cases of swine fever were reported from Friesland, and steps should be taken to prevent the importation of this disease from abroad.

HOLLAND. (1936). Overzicht der onderzoekingen van het uit de praktijk ingezonden ziektematerialen in 1935. [**Report of Diagnostic Work Done in 1935 at the Parasitic and Infectious Disease Institute at Utrecht University**]. [JANSEN, J.]—*Tijdschr. Diergeneesk.* **63.** 663-671. 2 figs., 1 table.

This report is a summary of the examination of material of diverse origin. The most noteworthy cases seen were TB., pigeon pox, trichomoniasis and poisoning through eating buds of *Hydrangea hortensia*—all these conditions in pigeons. Coccidiosis of the kidneys (*Eimeria truncata*) was found in a goose, while TB. was

detected in turkeys and peacocks. *Clostridium novyi* was twice isolated from abscesses in horses. *Streptococcus equi* was isolated from pus of two mares with abscesses around the anus and vulva. Generalized TB. was found in wild owls (*Tyto alba*), and coccidiosis was also diagnosed (*Isospora buteonis*) in other owls. In silver foxes *Salmonella enteritidis* var. *dublin* was the commonest pathogen detected, and some cases of TB. were found.—JAC. JANSEN (UTRECHT).

JANKAUSKAS, S. (1938). Antrąji valdines veterinarijos organizacijos darbuotes dešimtmeti bebaigiant. [**The Second Ten Years' Work of the State Veterinary Service, Lithuania**].—*Vet. ir Zootech., Kovno.* **15.** 129-140.

After the last war there was a great shortage of veterinarians in Lithuania, the number in 1922, for instance, being only 24. Animal diseases were widespread in the country during the war. Meat was inspected only in the large towns. The veterinary service took measures to increase the number of veterinarians, and in 1922 a veterinary section was opened at the Faculty of Medicine, Kaunas University; owing to lack of personnel and necessary equipment, however, this section only existed for six years, and produced only 15 graduates. From 1928 Government grants provided for veterinary study abroad, until 1938, when a Veterinary Academy was again founded at Kaunas.

In the first ten years after the war certain animal diseases were eradicated; in the second decade more attention was paid to the control of chronic infections such as tuberculosis and brucellosis. Meat inspection was put under control. At present meat inspection is carried out in Lithuania in over 120 country towns. In the next decade it is anticipated that the veterinary service will undertake milk control work and regulate the slaughter of horses for human consumption.

—A. PABIJANSKAS (KAUNAS).

PORTUGAL. (1938). Nota estatística dos serviços do Laboratório Central de Patologia Veterinária nos anos de 1936 e 1937. [**Statistical Report of the Central Laboratory of Veterinary Pathology, Lisbon, for the Years 1936 and 1937**].—*Repos. Lab. Pat. vet., Lisboa.* **3.** 267-281.

The following are the numbers of the specimens dealt with and examinations carried out:—(1) bacteriological and serological, 9,312; *Mycobact. tuberculosis*, 1,044; *Brucella abortus*, 675; *Pasteurella suiseptica*, 225; *Salmonella cholerae-suis*, 106, and *S. paratyphi-B.*, 55: (2) ecto- and endo-parasites, 326: (3) histopathological examinations in 1936, 59; no examinations during 1937: (4) P.M. examinations, total 163—swine fever, 28; enteritis, 12: (5) physical and chemical, total 1,119: (6) testing of sera and determining strength of disinfectants, total 440.

The laboratory produced over 1,000 litres of foot and mouth disease serum, 377 litres of swine fever serum, 134 litres of the virus, 414 litres of lactic ferments, and 1,729 c.c. of concentrated tuberculin. It is to be noted, however, that the laboratory's output in 1937 was only half that of the previous year.—J. PASFIELD.

FRENCH WEST AFRICA. (1939). État sanitaire du cheptel pendant l'année 1937. [**Report on Animal Diseases in French West Africa in 1937**]. [CURASSON, G.] —*Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 1. 61-76.

[A description of livestock diseases is given *seriatim* for each territory; in this abstract, however, the figures given below have been roughly calculated to embrace the whole of French West Africa].

ANTHRAX and BLACKLEG outbreaks occurred in various localities; vaccination was carried out to a limited extent. BOVINE TUBERCULOSIS was rarely seen in the course of abattoir inspection. An intensive study of TRYPANOSOMIASIS was begun; a few notes on its occurrence are given.

RINDERPEST was prevalent everywhere but in French Guinea, losses reported being about 10,500. Over 400,000 cattle were immunized, mostly by formol-vaccine, some by sero-vaccination, some by vaccine-virus and a small number by serum alone. In Senegal wild pigs have been incriminated as carriers.

FOOT AND MOUTH Disease occurred in the provinces of Sudan and Niger. CONTAGIOUS BOVINE PLEURO-PNEUMONIA occurred in all colonies except French Guinea and Dahomey, and some 14,000 cattle were vaccinated [no details]. AFRICAN HORSE SICKNESS gave much less trouble than usual, only one case occurring at Dakar and 12 in the French Sudan. SHEEP POX was observed only locally, in the provinces of Sudan and Senegal; CAMEL POX was seen in Mauritania and FOWL POX in every colony. Three cases of AUJESZKY'S disease occurred in French Guinea and several cases of RABIES in French Guinea and the French Sudan. PLEURO-PNEUMONIA OF GOATS is listed under virus diseases; it is endemic in the Niger province.

Short notes are also given on a few other infectious and parasitic diseases.

—J. E.

Extracts from Annual Reports of Agricultural Experimental Stations U.S.A.

[The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports will be found in *Index Veterinarius*].

ARKANSAS, 1936-37. The egg production and food utilization of hens treated by kamala and nicotine sulphate was no better than in comparable hens not so treated, observations lasting for one year.

CALIFORNIA, 1936-38. The present knowledge on research and control of the following diseases is given, original references being appended :– cattle diseases —mastitis, tuberculosis, brucellosis, trichomoniasis and anaplasmosis: sheep diseases—caseous lymphadenitis, enterotoxaemia and stomach worms: swine diseases—swine pox: poultry diseases—pullorum disease, coryza, paratyphoid in chick and turkey poults, coccidiosis, fowl pox, " swell head " (sinusitis) of turkeys, *Hexamita* infection in turkeys and hereditary lethal factors: entomology—myiasis in livestock (*Lucilia* and *Phormia*).

COLORADO, 1937-38. Notes are given on bovine brucellosis control; equine encephalomyelitis; enterotoxaemia, coccidiosis, sore mouth (ecthyma), internal parasites and " sore head " (filariasis) in sheep, and on poisonous plants (oat hay, onion, *Suckleya suckleyana* and silky sophora).

CONNECTICUT (STORRS) 1936-37. [Owing to the wealth of original data, this report is abstracted separately below].

IDAHO, 1937. The following results are given :– (1) Mastitis is not transmissible by infected milk filtrate. (2) Sulphanilamide causes the disappearance of streptococci from milk of cows with mastitis, but they reappear on cessation of treatment. (3) Pullorum disease is discussed (diagnostic tests, infection in immature pullets and in pheasants). (4) The susceptibility to fowl paralysis of day-old chicks from a clean flock is very great, but declines sharply within a few weeks; an affected flock acquires resistance. (5) A study of the inheritance of disease-resistance in fowls was begun. (6) Orchard grass is rich in manganese and consequently valuable for the prevention of perosis.

INDIANA, 1936-37. (1) Comparison of rapid and slow tests for pullorum disease was made. (2) Various observations on immunity in bovine brucellosis are given. (3) Results of urine analysis of pigs with swine fever are given, also notes on the efficacy of many commercial S.F. antisera. (4) Several experiments

designed to indicate the unity of fowl paralysis, leucosis and neoplasia gave inconclusive results. (5) Notes are given on results of general P.M. diagnostic work.

Iowa, 1936-37. (1) Tumour filtrate from fowls with the lymphoid type of fowl leucosis was submitted to electrophoretic tests, results at various pH being given. (2) Tentative evidence for the heritability of fowl paralysis was obtained by breeding trials. (3) The value of manganese for preventing perosis was verified (0·0035% Mn in the diet is the minimum required). (4) Lambs brought up on cows' milk tend to develop anaemia, which is curable by administration of ferric chloride plus copper sulphate; normal lambs have 10-12 g. haemoglobin per 100 c.c. blood. (5) The vitamin D content of cows' milk is increased by feeding irradiated yeast, certain molds and ergosterol, though cows are inefficient in passing on extra vitamin D from food to milk; hens are relatively more efficient in transferring it from food to egg. (6) Tests with goats indicated the relative unimportance of vitamin E for reproduction. (7) Work on fluorine toxicosis on rats is reported. (8) Inheritance of resistance of fowls to fowl typhoid was demonstrated experimentally; similarly the resistance of mice to typhoid [? *Salmonella typhi*].

Iowa, 1937-38. (1) A regional laboratory for poultry disease research was founded at East Lansing, Michigan; it will cooperate with Iowa. (2) The research projects numbered (1) and (2) in the 1936-1937 report above were continued [no data]. (3) Data on the prevention of perosis in turkeys are given. (4) Tests with sheep indicated the importance of vitamin E for reproduction [cf. item (6) above]. (5) Dried buttermilk enhances rather than inhibits the severity of avian coccidiosis. (6) Resistance to disease: further progress was made on item (8) above.

Massachusetts, 1937-38. (1) There are now 241 pullorum disease-free breeding flocks in the State capable of supplying all poultry farmers. (2) Results of general P.M. diagnostic work are given. (3) An attempt to control infectious bronchitis in poultry by a vaccine failed. (4) Pullorum disease was found in two flocks of turkeys. (5) Avian encephalomyelitis (" epidemic tremor ") was studied [no data]. (6) A beginning was made in the investigation of a neoplastic disease of fowls.

Michigan, 1937-38. Short notes are given on the following [all of which have been described in periodicals indexed by this Bureau] :– streptococcal mastitis, streptococcal infection in dogs, brucellosis in cattle and in man, antigenic and chemical study of brucella and the inheritance of umbilical hernia in rats.

Minnesota, 1936-37. The list of publications from the station includes some on veterinary subjects, showing the nature of the work and the journal reference in cases where independent periodicals were used. [Such papers are dealt with separately in the Bureau publications]. Veterinary research projects are also listed.

New Jersey, 1936-37. (1) Points of special interest for the poultry disease diagnosis service are stated. (2) A précis of work on the viruses of fowl pox, laryngotracheitis and bronchitis is given; all have been passaged in egg embryos. (3) A study of fowl paralysis and its inheritance was continued. (4) Pigeon paratyphoid was controlled with the aid of the agglutination test.

Rhode Island, 1937. (1) Growth factors and their sources for *Haemophilus gallinarum* were studied; also *H.g.* cultures were used as a vaccine against fowl coryza, but were not uniformally effective. (2) An attempt was begun to find a food factor capable of preventing encephalomalacia in chicks.

South Carolina, 1936-37. (1) An inconclusive experiment on the effect of kidney worm infestation on the growth of pigs is reported. (2) An unsuccessful attempt was made to immunize fowls against fowl paralysis by a formol vaccine.

South Dakota, 1936-37. (1) In a controlled experiment, pigs infested with

Ascaris and kept on pasture containing chenopodium plants did not benefit in general condition or degree of infestation. (2) Work was done on the nature of the toxic substance in grain causing alkali disease (selenium poisoning), on the tissue Se content of poisoned dogs, and on Se tolerance and toxicity in fowls.

UTAH, 1936-38. A note is given on the duties of the single veterinarian on the staff of the station. Notes are also given on animal diseases investigated at the station during its fifty years' work.

WASHINGTON, 1937-38. (1) Factors influencing the reliability of the Hotis test for mastitis are discussed. (2) An experimental study of a liver disease of swine (" hard liver ") drew attention to the yellow burweed (*Amsinckia intermedia*) as the probable cause. (3) *Salmonella pullorum* in soil remains infective during winter frosts, but dies out in spring.

WISCONSIN, 1937-38. (1) Research in progress on mastitis is discussed. (2) Cases of *Brucella abortus* infection in cows which calved normally and had no specific agglutinins are described; the possession of blood having a good bactericidal power against brucella *in vitro* is no evidence that cows are resistant to fresh infection. (3) Sulphur in the diet of very young chicks makes them more resistant to coccidiosis, but also tends to cause alopecia. (4) Both ferrous and ferric iron are a cure for anaemia. [Several other nutrition-disease items also appear, as well as several others not closely related to the interests covered by this Bureau]:

WYOMING, 1937-38. Short notes are given on fowl coryza (failure of a vaccine), infectious abortion in ewes, calf diphtheria, equine encephalomyelitis, contagious ecthyma, and on oat hay and other plant poisoning.—J. E.

UNITED STATES OF AMERICA. CONNECTICUT. (1937). **Report of Work on Animal Diseases at Storrs Agricultural Experiment Station, 1936-1937.**—*Rep. Storrs agric. Exp. Sta. 1936-37.* pp. 15-31. 2 tables.

For the control of BOVINE BRUCELLOSIS 40,000 blood samples were tested, 560 herds being involved; 344 of them passed one or more tests under the federal eradication plan. The disease was eradicated quickly in 64% of the herds under control, by the removal of reactors to the first test. Reinfection in clean herds has caused some trouble. A multiple pipetting machine for use in the agglutination test was designed.

Much work was done on MASTITIS—diminution of milk yield, serological typing of streptococci, diagnosis by various rapid tests, control by segregation and the staphylococcal type of infection being dealt with. The pathogenicity of staphylococci examined was closely related to their haemolytic power for cows' blood.

Salmonella bareilly and *S. montevideo* were isolated from fowls, evidently for the first time.

A study was made of a MENINGO-ENCEPHALITIS of sheep which was found to be associated with listerella infection.

FOWL PARALYSIS and allied diseases were studied and a report made in Station Bulletin 218 [*V. B.* **8.** 458].

The report also contains an interesting survey of animal diseases of Connecticut, including statistical information.—J. E.

UNITED STATES OF AMERICA. NEVADA. (1938). **Report of Division of Animal Industry, State Department of Agriculture, 1936-1938.** [EARL, W. B.] —*Bienn. Rep. Nev. Dep. Agric. 1936-38.* pp. 10-23.

STAFF.—Two whole time and three part time veterinarians were employed by the state.

ANIMAL DISEASES.—No serious losses occurred, but ANTHRAX and EQUINE ENCEPHALOMYELITIS were troublesome in certain areas. A single dose anthrax vaccine has now been adopted for general use and was applied on a large scale. The state retained its status as a modified accredited area. Control of bovine BRUCELLOSIS was intensified and blood tests were extended to beef and range cattle. There were 33 accredited herds at the end of the biennium. BACILLARY HAEMOGLOBINURIA in cattle persisted and caused small losses ; a vaccine is available for immunization. EQUINE ENCEPHALOMYELITIS was controlled by serum-virus immunization, while serum is also available for curative and short term protective purposes. Vaccination against SWINE FEVER was only permitted for garbage-fed swine kept in quarantine. In other herds disease is controlled by legal veterinary-police methods alone. Nevada was free from RABIES in dogs. Statistics are given of state control work.—J. E.

BOOK REVIEWS

HADLEY, F. B. [D.V.M., Professor of Veterinary Science in the University of Wisconsin and Veterinarian of the Wisconsin Agricultural Experiment Station]. (1939). **Principles of Veterinary Science.** pp. 594. 127 figs., 1 chart. Philadelphia & London : W. B. Saunders Company. [3rd Edit.] [8vo] [18s.]

This is a completely revised edition of a book written for agricultural students ; the second edition appeared in 1924.

It is an excellent book of its type and easily the best for agricultural students that the reviewer has seen, as it is very well-balanced and gives the essentials of anatomy, physiology, general pathology, pharmacy, hygiene, zootechny, obstetrics and the common diseases of farm animals and their treatment.

The figures are very good ; many have been borrowed from veterinary text-books (*e.g.* from Sisson's " Anatomy "). The general lay-out and printing are also excellent. There is a good index.—J. E.

BURDON, K. L. [Ph.B., Sc.M., Ph.D. Assistant Professor of Immunology, Louisiana State University School of Medicine, New Orleans ; Senior Visiting Pathologist, Charity Hospital of Louisiana at New Orleans ; formerly instructor of Bacteriology, Immunology and Public Health, Washington University School of Medicine, St. Louis]. (1939). **Medical Microbiology.** pp. xii +763. 120 figs. [Numerous refs.] London & New York : Macmillan Company. [8vo] [18s. 6d.]

This book has been written on much the same lines as the author's *Text-book of Bacteriology* published a few years ago. It is essentially a book for medical students, and the needs and interests of the undergraduate have been given primary consideration. It deals primarily with fundamentals and the arrangement of the subject matter departs from the conventional in several aspects.

The book consists of four parts. Part I treats of the fundamentals and history of microbiology at a much greater length than is usual in such text-books. Part II deals with the use of the microscope, microscopic methods and laboratory technique. This is followed by a consideration in Part III of the various phenomena usually described under the headings of infection and resistance, and Part IV, which occupies less than one third of the book, contains the bacteriology of important infectious diseases. B. is certainly original in the way he has dealt with his subject, and he has presented a wealth of information in a most interesting style. To do this however, much strictly bacteriological information has been omitted and comparatively little detail is given of cultural characters, biochemical reactions, etc.,

which are essential for the identification of the causal organisms. There are, however, useful appendices dealing with stains, reagents, culture media, serological tests, etc., and one containing review questions on each chapter of the book.

From the veterinary standpoint the book contains little essential information that is not already available, and being purely a text-book of human microbiology it makes little reference to diseases of animals not communicable to man. Where reference has been made to animal diseases, some of the statements are not strictly correct, *e.g.* one could hardly maintain that actinomycosis was commoner in the horse than in man (p. 633).

The book is very well written and produced. Incidentally in the review copy pages 277-290 are duplicated.—GWILYM O. DAVIES.

SCHEUNERT, A. [Dr. med. vet. et phil., o. Prof. a.d. Universität Leipzig. Direktor des vet.-physiol. Instituts], TRAUTMANN, A. [Dr. med. vet., o. Prof. a.d. Tierärztl. Hochschule in Hannover. Direktor des physiol Instituts], & KRZYWANEK, F. W. [Dr. med. vet., o. Prof. a.d. Friedrich Wilhelms-Universität Berlin. Direktor des Instituts für Vet.-Physiologie]. (1939). Lehrbuch der Veterinär-Physiologie. [**Text-Book of Veterinary Physiology**]. pp. viii+449. 169 figs. Berlin: Paul Parey. [8vo].

This book has been written to take the place of the 3rd edition of *The Comparative Physiology of the Domesticated Animals*, by ELLENBERGER and SCHEUNERT (1925) and a 4th edition of that book will not be produced.

The shortening of the veterinary course in Germany has created a need for a short text book on veterinary physiology which covers the whole subject and which can be brought up to date easily from time to time. This book has been written with this object in view. It consists of ten sections; the first two are introductory covering 49 pages. Section 3 is entitled "The ingestion, utilization and excretion of solid and liquid food"; it is the largest section of the book and covers 155 pages. Curiously enough, in this section are included the blood, and the circulatory, lymphatic and the reticulo-endothelial systems. Section 4 deals with respiration (24 pages); section 5, with the total metabolism of the animal body (30 pages). Section 6 deals with the endocrine control of metabolism and includes a section upon vitamins in relation to metabolism (45 pages). Section 7 deals with the physiology of muscle and locomotion (26 pages); section 8 with the organs of special sense (43 pages); section 9 with the central, peripheral and autonomic nervous systems (33 pages), and section 10 with reproduction (18 pages). The index comprises the remaining 18 pages.

The value of the book can be roughly assessed by the space allotted to the various sections. The text is exceedingly condensed and numerous illustrations and diagrams are included. It offers somewhat different views from those expressed in *The Physiology of the Domestic Animals* by Professor H. H. DUKES [*V. B.* **8.** 66.], as it summarizes the research of continental workers, while DUKES lays more stress upon American work. It is to be regretted that no references are given, as this omission considerably reduces the value of the book for those engaged in post-graduate study and research.—A. T. PHILLIPSON.

TEHVER, J. [Dr. med. vet., Professor of Histology and Embryology of Domestic Animals at the University of Tartu, Estonia]. (1938). Koduloomade sigimine. [**Reproduction in Domestic Animals**]. pp. 185. 65 figs., 2 plates, numerous tables. [Numerous refs.] Tallinn: Kirjastusühisus "Agronoom." [Kr. 3.20].

The book gives a survey of the present knowledge on the subject. Its purpose

is to be of service to many different readers—in the first place to the scientist, and also to stock inspectors and to the better educated stock-farmers.

There are chapters on :– reproduction in general, the genital organs, secondary sexual characters, germ cells, the sexual-cycle, oestrus, mating and artificial insemination, ovulation, sex hormones, foetal development and growth, foetal membranes and the placenta, growth after birth, duration and diagnosis of pregnancy, parturition, the sex-ratio and efforts to influence it, fertility, and milk and its secretion.—ELFRIIDE RIDALA (TARTU).

DAVIES, W. L. (1939). **The Chemistry of Milk.** pp. xiv+534. 27 figs., 123 tables. [Numerous refs.] London: Chapman & Hall Ltd. [2nd Edit.] [8vo] [25s.]

Milk and its derivatives have an international appeal and importance as articles of food and their study has interested scientific workers from many different aspects. The chemistry of milk, in its widest aspects, has an appeal to both pure and applied chemists, physiologists, nutritionists and to workers in specialized branches of agricultural, medical and veterinary research as well as to those concerned with the economic side of milk, the producers and manufacturers. Because of the breadth of this appeal, this book, now in its second edition within three years, has already achieved a great popularity, largely through the thoroughness with which the author has tackled his subject, in the presentation of established knowledge, in the critical review of work which has yet to receive confirmation and in the broad suggestions of lines of future investigations. Not a little of the data presented has been the result of researches by either the author himself or workers closely associated with him.

Broadly, the book is divided into five sections: the general composition of milk; its specific constituents; its physical chemistry; the chemistry of milk processing, and finally, the nutritional value of milk. The first section is general and is well worth studying by anyone interested in the subject, and while the subsequent sections will appeal more to the specialist in the various fields, it is to be remembered that this book is a very complete reference work, covering some 1,500 references. The section on milk constituents, comprising one-third of the contents, is a thorough exposition of all the major and minor elements and compounds, including vitamins, found in milk.

A few errors overlooked at the proof stage were noticed, and a random examination of the author index showed the omission of a name referred to in the text. In various places, the author's attempts at condensation of the material have made the style a little heavy and the meaning somewhat obscure. Generally, the excellent tendency in modern text-books towards a clear presentation of tables, diagrams and chemical formulae has been well maintained and the printing is good.

From the veterinary aspect, one would like to have seen a considerable expansion of the material dealing with the effect of disease on the composition of milk, especially the "metabolic disorders". There is no mention of any of the "acetone bodies" being normally present in milk, nor of the large increase of these bodies in the milk under various conditions of metabolic upset.

However, the material of the book is so complete that it should serve as a most valuable reference work for some years to come, and the author is to be congratulated on the highly successful result of a seemingly tremendous task.—A. EDEN.

NORTHROP, J. H. [Member of the Rockefeller Institute for Medical Research]. (1939). **Crystalline Enzymes. The Chemistry of Pepsin, Trypsin, and Bacteriophage.** pp. xv+176. 48 figs., 35 tables. [Numerous refs.] New York: Columbia University Press. [8vo] [$3.00].

The non-living character of enzymes was first shown by BUCHNER in 1897, but it was not until 1926 that an enzyme, urease, was first isolated in crystalline form by SUMNER [*J. biol. Chem.* **69.** 435]. The author and co-workers have isolated and crystallized pepsin, trypsin, chymotrypsin, and carboxypepsidase, while other workers have obtained catalase, amylase, ficin, pepsin and lysozyme, and the important respiratory ferment of WARBURG [(1933). *Biochem. Z.* **258.** 496.] has also been isolated. In all cases the protein nature of these enzymes has been demonstrated. As the author has played a big part in isolating many of these enzymes and made extensive investigations into their composition, chemical properties and reactions, this book by him, based on a series of lectures given at Columbia University presents a personal and detailed annotation on the present state of knowledge of their chemistry.

The scope of the book deals more specifically with work carried out by the author and his collaborators in New Jersey, with full discussion of cognate work by other authors. The general chemistry of enzymes is introductorily, yet thoroughly dealt with, followed by chapters devoted to :– pepsin ; pepsinogen ; chymo-trypsinogen and chymo-trypsin ; trypsinogen ; trypsin and trypsin-inhibitor ; carboxypeptidase, and finally, a consideration of bacteriophage, which although not yet isolated in crystalline form, has nevertheless been subjected to very exhaustive researches. The latter chapter could be most profitably perused by those working on bacteriological and virus problems. About one-fifth of the book comprises an appendix, giving full details of the preparation and crystallization of the enzymes. This excellent feature of keeping details of technique apart from the experimental work makes the book as a whole much more readable and comprehensible. Finally an extensive bibliography is given.

In a book of this type it might have been advisable to have included an equally full account of those enzymes which other workers have isolated, although the author could hardly have given the same personal touch to them. No doubt as more knowledge is gained the subject matter will have to be expanded, possibly much of the data modified when other workers bring their researches and considerations to bear upon the subject, but in the meantime the book should prove of immense value to those working in this field, since all the cognate knowledge distributed variably throughout the literature has been assembled therein, together with full details of technique. The general lay-out, diagrams, exposition and printing are very clear, and, in short, the book contains a wealth of knowledge, especially valuable to those working in the general field of enzyme studies.—A. E.

CLAY, H. H. [F.R.San.I., F.I.S.E., Fellow of the Sanitary Inspectors' Association, Assistant in the Division of Public Health, and Lecturer in Sanitary Engineering, London School of Hygiene and Tropical Medicine (University of London); Lecturer and Demonstrator to students at the Royal Sanitary Institute]. (1939). **The Sanitary Inspector's Handbook. A Manual for Sanitary Inspectors and other Public Health Officers.** pp. xxii +528. 97 figs., numerous tables. London: H. K. Lewis. [4th Edit.] [8vo] [17s. 6d.] [See also *V. B.* **8.** 66].

This fourth edition was produced in response to demand for the last edition of 1937, and the opportunity has been taken to revise it in accordance with the terms of the Food and Drugs Act of 1938, extracts from which form the introductions to each chapter. Otherwise the book retains its previous form, except that it is longer by some 30 pages.

For reviews of previous editions the reader is referred to this *Bulletin.* **4.** 82, **6.** 630, and **8.** 66.—J. E.

LONG, P. H. [M.D., Associate Professor of Medicine, The School of Medicine, The Johns Hopkins University; Associate Physician, The Johns Hopkins Hospital; Lecturer in Epidemiology, The School of Hygiene and Public Health, The Johns Hopkins University], & BLISS, Eleanor, A. [Sc.D., Fellow in Medicine, The School of Medicine, The Johns Hopkins University]. (1939). **The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds.** pp. vii+319. 2 tables, 6 charts. [Numerous refs.] London: The Macmillan Company. [8vo] [15s. 6d.]

It is only about six years ago that the first communication on the clinical use of a drug of this series was made, but already a vast literature has accumulated and is still constantly growing. The present volume therefore comes at a very opportune time and very satisfactorily fills the need for a summing up of the literature.

After a short and interesting historical review the experimental work on the various drugs is described, and this is followed by a discussion of the toxic effects which may be produced in animals and man. A special addendum describes the renal complications which may follow the use of sulphapyridine. The large number of observations on the mode of action of the drugs are then critically discussed, and it is concluded that so far no theory has been evolved which adequately explains the mode of action of these sulphur-benzene derivatives. Nearly half the book is devoted to the clinical use of the drugs in medical and veterinary practice; their value in a number of conditions is now well recognized, but beneficial effects have been claimed in a large number of other conditions; in spite of the fact that much of this work has only appeared within the last year or two, the authors have succeeded in indicating very tersely which work appears to them valuable, and where further investigation is needed.

Each chapter contains a very good bibliography and the book ends with a comprehensive index. The chemical formulae of the main compounds are given in the very beginning. It undoubtedly deserves four stars.—J. M. ROBSON.

LEMAY, P. [Docteur de l'Université]. (1938). Cancer et tréphones de Carrel. [**Cancer and the Trephones of Carrel**]. pp. 132. [Numerous refs.] Paris: Librairie E. le François. [8vo] [Fr. 20].

In this short work L. explains his theory of the development of neoplasms on a basis of a disturbance of the equilibrium between the so-called "trephones" of Carrel (substances derived from undifferentiated tissue cells which stimulate neoplastic proliferation) and inhibitory substances in the blood serum. L. first published his views on this conception in 1924 and has amplified them in numerous articles in French journals since that date. Various chapters deal with such varying topics as eugenics, biophysics, cancer in insects etc., and the unorthodox views put forward can hardly be described here. Those interested should consult the original. References are given at the end of each chapter, but they refer almost entirely to French journals.—E. G. WHITE.

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The latest list of the publications indexed for this purpose was included in *Index Veterinarius*, Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin*, Vol. 9, No. 1.

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ERRATUM.

p. 377. HUBER, F. L., & KRANEVELD, F. C. (1937-1938). for "were treated either with culture filtrate, blackleg culture or blackleg muscle powder" read, "were treated subsequently with culture filtrate, blackleg culture and blackleg muscle powder".